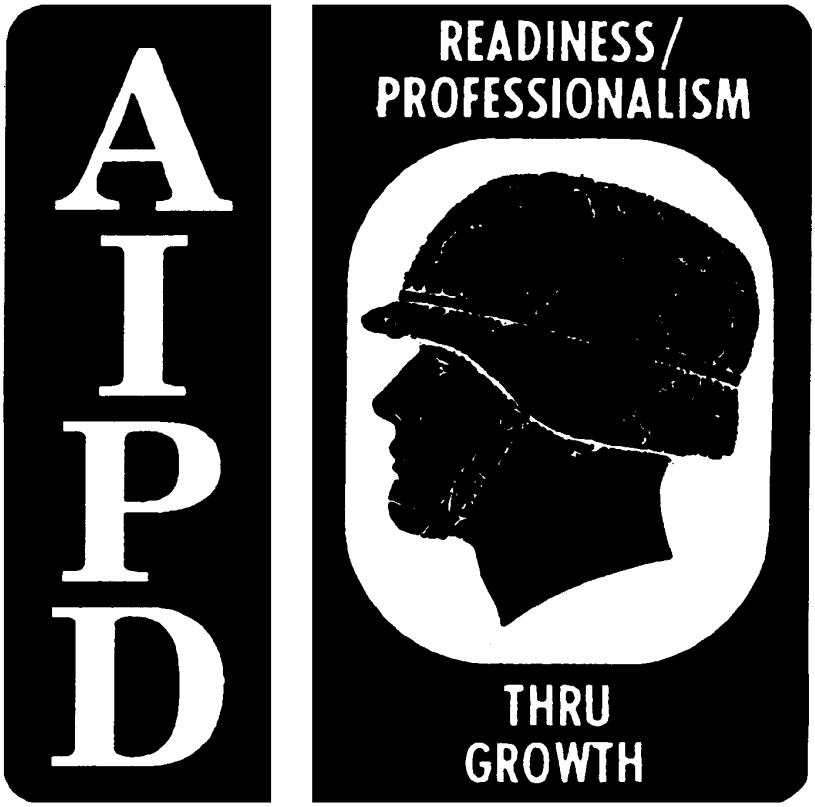
SUBCOURSE
TR0636

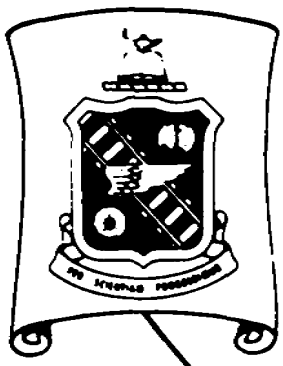
EDITION
7

RAIL OPERATIONS, YARD



THE ARMY INSTITUTE FOR PROFESSIONAL DEVELOPMENT

ARMY CORRESPONDENCE COURSE PROGRAM



CORRESPONDENCE COURSE OF THE U. S. ARMY TRANSPORTATION SCHOOL

RAIL OPERATIONS. YARD

LESSON EXERCISES
TRANS SUBCOURSE 636

Fort Eustis, Virginia

Supersedes Trans 636, Rail Operations, Yard, November 1970.

TRANS SUBCOURSE 636

RAIL OPERATIONS, YARD

INTRODUCTION

You may have often seen railroads in operation, cars being switched back and forth in busy yards, and trains rolling over the main line, stopping and starting in obedience to mysterious rules and signals. But have you ever stopped to think why these operations are performed and how the railroads do their lob of delivering freight and passengers on time to their destination?

Someday you may take part in operating a military rail yard or terminal. While it is not likely that this subcourse alone can qualify you to operate either, it does introduce you to the procedures and practices you will find in use there. After studying the reference text to the subcourse, you should be able to identify the types of yards and their distinguishing characteristics; to describe the operations and the clerical work involved in breaking up and making up trains and in getting them ready for the main line; and to identify the personnel who perform yard work and describe their duties. Finally, you should know some of the rules governing safety in rail yard operations and what things to guard against while working on and around moving engines and cars.

Because commercial railroading is more familiar than military, civilian practice is taught; and because the great majority of rail traffic is freight, classification yards and road trains are discussed from the standpoint of freight operations. But, military or civilian, passenger or freight, the principles are the same, and they apply as well in a theater of operations as on commercial railroads in the United States.

This subcourse consists of four lessons and an examination, divided as follows:

		Credit hours
Lesson 1,	Rail Yards and Terminals	2
2,	Yard Operations	4
3,	Yard Personnel	2
4,	Safety	1
Examination		2
	Total	11

You are not limited as to the number of hours you may spend on the solution of any lesson or the examination of this subcourse.

Text and materials furnished: Reference Text 636, Rail Operations, Yard, March 1974, with annex A, sheets 1 and 2.

Upon completion of this subcourse, you keep the reference text and all lesson assignment sheets; do not return them with your answer sheet.

LESSON 1.....Rail Yards and Terminals.

CREDIT HOURS.....2.

TEXT ASSIGNMENT.....Reference Text 636, pars. 1.1-1.8.

MATERIALS REQUIRED.....None.

LESSON OBJECTIVE.....To enable you to identify the various types of yards, and to describe their distinguishing characteristics.

SUGGESTIONS.....None.

EXERCISES

Weight		True - False
		(On the answer sheet mark "X" under A for true or under B for false.)
2	1.	Occasionally, freight trains passing a yard need not be inspected.
2	2.	Yardmasters have no control over the main tracks, even in their yard areas.
2	3.	The desirable length of yard tracks is determined by the number of cars a switch engine can handle.
2	4.	Locomotives waiting to be dispatched on a run are usually placed on a turntable track.

Weight Cluster True - False

(Each of the following groups of questions is related to the statement that immediately precedes the group. On the answer sheet, indicate which are true and which false with respect to the statement by marking "X" under A for true or under B for false.)

FIRST GROUP

Which of the following yard characteristics tend to speed up switching?

3 5. Long switching leads.

3 6. Divided leads.

3 7. Main yard divided from an auxiliary yard by the main line.

3 8. Short lead approaches.

3 9. Inside main tracks.

SECOND GROUP

A large rail yard usually contains which of the following facilities?

3 10. Transfer tracks.

3 11. Industrial sidings.

3 12. Rip tracks.

3 13. Caboose tracks.

3 14. Turntable.

THIRD GROUP

In comparing a progressive yard with a combination yard, you know that:

2 15. A running track runs the entire length of a progressive yard but a combination yard has no such track.

Weight

2 16. Either type must have re-icing facilities if it handles perishable freight.

2 17. Progressive yards are generally hump-type yards where as combination yards are usually flat.

2 18. Tracks in a progressive yard are designated for receiving, classification, and departure, whereas tracks in a combination yard are used interchangeably for these purposes.

2 19. Cars can be switched through a combination yard with fewer delays than through a progressive yard.

FOURTH GROUP

When two switching crews are working at one end of a yard, you know that:

3 20. The yardmaster can minimize delays by his choice of switching cuts.

3 21. At times, the crews may exchange cars.

3 22. One crew normally does all the classifying of cars and the other crew does all the doubling

3 23. The crews may exchange places on the leads from time to time.

3 24. Each crew temporarily holds out cars belonging to the other crew on any track with enough room.

FIFTH GROUP

Which of the following can happen when tracks are too short for inbound or outbound trains?

3 25. Track length makes no difference when the train is outbound.

3 26. The lead must be blocked while doubling is being done.

3 27. Fifteen cars of a 65-car inbound train would have to be doubled to another track if the train entered the yard on a 50-car track.

Weight

3 28. Yard crews are delayed if cars must be doubled to another track.

3 29. An air test of a doubled outbound train would not cause the lead to be blocked.

SIXTH GROUP

From your study of the various types of rail yards you know that:

2 30. Switchtenders are generally employed in nonretarder hump yards.

2 31. In a combination yard, track length is determined by the number of trains entering and leaving the yard each day.

2 32. Car retarders may be used to reduce the speed of cars by friction in a hump classification yard.

2 33. The ideal type of yard at a large terminal is a progressive yard.

2 34. Most railroads with a double-track main line have divided yards.

Multiple - Choice

(Each question in this group contains one and only one correct answer. Make your choice by marking "X" in the proper space on the answer sheet.)

2 35. If you were an engineer planning to build a railroad yard, you would probably run your main-line track:

A. Through the departure yard.
B. Some distance from the yard tracks.
C. Between the eastbound and westbound yards.
D. Through the receiving yard.

Weight

2 36. Divided leads are desirable because they enable:

A. Eastbound and westbound traffic to use the same yard.
B. Two yard crews to work at the same time.
C. The yard to operate with fewer classification tracks.
D. Road engines to proceed to and from the roundhouse without interference.

2 37. Transfer tracks are used for which of the following?

A. Servicing locomotives.
B. Moving locomotive to sand house.
C. Placing cars in dead-car storage.
D. Preventing delays caused when cars need repairs.

2 38. In a progressive yard, where are cars usually inspected?

A. In the receiving yard.
B. On a shop track.
C. In the classification yard.
D. In the departure yard.

2 39. The most serious consequence of a yardmaster's having no clear tracks would be the possible delay to:

A. Yard crews.
B. Outbound road trains.
C. Car inspectors.
D. First-class trains.

2 40. Many railroads in the United States divide their yards into _____ sections.

A. First- and second-class.
B. Local and long-distance.
C. Eastbound and westbound.
D. Active and storage.

LESSON ASSIGNMENT SHEET

TRANS SUBCOURSE 636.....Rail Operations, Yard.

LESSON 2.....Yard Operations.

CREDIT HOURS.....4.

TEXT ASSIGNMENT.....Reference Text 636, pars. 2.1-2.15; annex A, sheets 1 and 2.

MATERIALS REQUIRED.....None.

LESSON OBJECTIVE.....To enable you to describe the procedures involved in breaking up and making up trains, the fundamentals of freight blocking, the methods of switching according to freight already on hand, and the timesaving switching expedients which help to eliminate doubles.

SUGGESTIONS.....None.

EXERCISES

Weight	True - False

(On the answer sheet mark "X" under A for true or under B for false.)

1 1. When an inbound train comes into the receiving yard, the yard clerk and car inspectors do their work on it before the train is switched.

1 2. The grouping marks for a car or block are usually the abbreviated name of the city or the initials of the telegraph office.

1 3. In a westbound yard, yard clerks must begin their checks of tracks at the west end of the train.

Weight

1 4. A railroad belonging to another company is referred to as a foreign road.

Cluster True - False

(Each of the following groups of questions is related to the statement that immediately precedes the group. On the answer sheet, indicate which are true and which false with respect to the statement by marking "X" under A for true or under B for false.)

FIRST GROUP

Which of the following are principles to be followed in grouping freight?

2 5. The last block to be set off is placed just in front of the caboose.

2 6. Cars for the first setoff point are placed immediately behind the locomotive to minimize movement in setting them off.

2 7. Groupings of local freight are usually made for only one division.

2 8. Cars are doubled in the order that they will be set off en route.

2 9. In any one block, loaded cars are placed together.

SECOND GROUP

To convert a track check to a switch list, the yardmaster adds the following information:

2 10. Number and order of cuts.

2 11. Type or description of each car.

2 12. Track number to which cars are to be switched.

2 13. Destination of each car.

2 14. Whether cars are loaded or empty.

Weight

THIRD GROUP

On an inbound train, the yard clerk checks which of the following?

2 15. Contents of cars.

2 16. Car groupings.

2 17. Car initials.

2 18. Seal numbers.

2 19. Car numbers.

FOURTH GROUP

From your study of the yardmaster's journal, you know that it shows the following:

2 20. The status of each track in the yard.

2 21. Road crews called on duty to operate the outbound trains.

2 22. The name of the train dispatcher during the current shift.

2 23. The name of the train dispatcher during the current shift.

2 24. Consist of trains ready for departure.

FIFTH GROUP

From your study of the train on track 5 and the methods used by the yardmaster in switching it, you have learned that:

2 25. After the switching is finished, nine tracks are necessary to accommodate the cars of the first and second cuts.

2 26. After switching track 5, the train on track 9 is in proper station order.

2 27. The yardmaster's method of switching saved six cuts in the entire train.

Weight

2 28. In the third cut, even though no cut is eliminated by letting two groups go to the same track, time is nevertheless saved.

2 29. By doubling the cars on track 13 to the west end of track 6 and those on track 10 to the east end, an outbound train is made.

SIXTH GROUP

In determining the cutting and switching of an inbound train, the yardmaster's decision is based on the:

2 30. Freight already on classification tracks.

2 31. Types of cars in the inbound train.

2 32. Length of his switching leads.

2 33. Length of the inbound train.

2 34. Power of his switching locomotives.

Multiple - Choice

(Each question in this group contains one and only one correct answer. Make your choice by marking "X" in the proper space on the answer sheet.)

4 35. In the first switching cut shown in figure 2.3 and discussed in paragraph 2.11a, three SV cars are listed back to track 5. This move is advantageous because it saves:

A. The yardmaster the necessity of providing a separate track for the SV freight.
B. The time spent by the car inspectors.
C. A cut and consequently about 5 minutes for the crew.
D. A double when the outbound train is made up.

4 36. From your study of freight grouping or classification, which of the following trains is built up in INCORRECT station order for a westbound run from Conroy?

Weight

A. Engine	B. Engine	C. Engine	D. Engine
2 BL	19 RK	2 BL	14 LY
12 OG	12 WD	36 AY	64 AY
6 FV	16 FV	18 BR	24 BO
7 BO	19 BO	47 BV	19 SV
18 AY	4 LY	Caboose	12 DW
Caboose	Caboose		Caboose

3 37. According to the typical grouping area, the standing of the local train built up in paragraph 2.14b by the method of switching in column II of Figure 2.6 is:

A. Engine	B. Engine	C. Engine	D. Engine
2 BL	2 BL	2 BL	2 BL
2 MD	2 MD	2 MD	3 RK
4 OG	3 RK	3 RK	2 MD
9 WD	5 WD	4 OG	5 OG
3 RK	4 OG	9 WD	8 WD
5 BO	5 BO	5 BO	5 BO
7 LY	4 WD	7 LY	7 LY
12 AY	7 LY	12 AY	12 AY
Caboose	12 AY	Caboose	Caboose
	Caboose		

4 38. According to the typical grouping area, which of the following track standings is in proper station order?

(All read from west to east.)

A. 11 DN + 3 RK + 2 FV + 11 LY + 43 AY + 12 ELT.
B. 12 RK + 2 OG +8 WD + 9 BO + 2 FV +2 LY + 21AY + 33 DW.
C. 3 BL + 31 RK + 47 AY + 16 CY + 17 WD + 15 DW.
D. 39 AY + 17 EV + 21 OG + 12 MO + 13 BR + 28 BV.

4 39. You are yardmaster at Conroy, making up an outbound train containing 42 cars for the following destinations: 4 OG, 10 MD, 6 BL, 5 AY, 10 DW, 5 ELT, and 2 SV. A correctly built up train, and the most efficiently handled, is:

Weight

A. Engine	B. Engine	C. Engine	D. Engine
10 DW	6 BL	6 BL	5 AY
2 SV	10 MD	10 MD	4 OG
5 ELT	4 OG	4 OG	10 MD
5 AY	5 AY	10 DW	6 BL
4 OG	5 ELT	2 SV	5 ELT
10 MD	2 SV	5 ELT	2 SV
6 BL	10 DW	5 AY	10 DW
Caboose	Caboose	Caboose	Caboose

SITUATION

As yardmaster at a flat yard, you have a draft of 25 cars, shown on the next page, to switch. You have a derailment on your switching lead, and this draft will have to be switched in two cuts because of limited room. You are not concerned with switching these cars to make them immediately ready for an outbound train, but only with getting them switched to individual tracks according to efficient switching practices, as taught in paragraph 2.8a

REQUIREMENT

Using the information in the preceding situation, answer questions 40 and 41.

4 40. You should make your cut between DODX _____ and DODX _____.

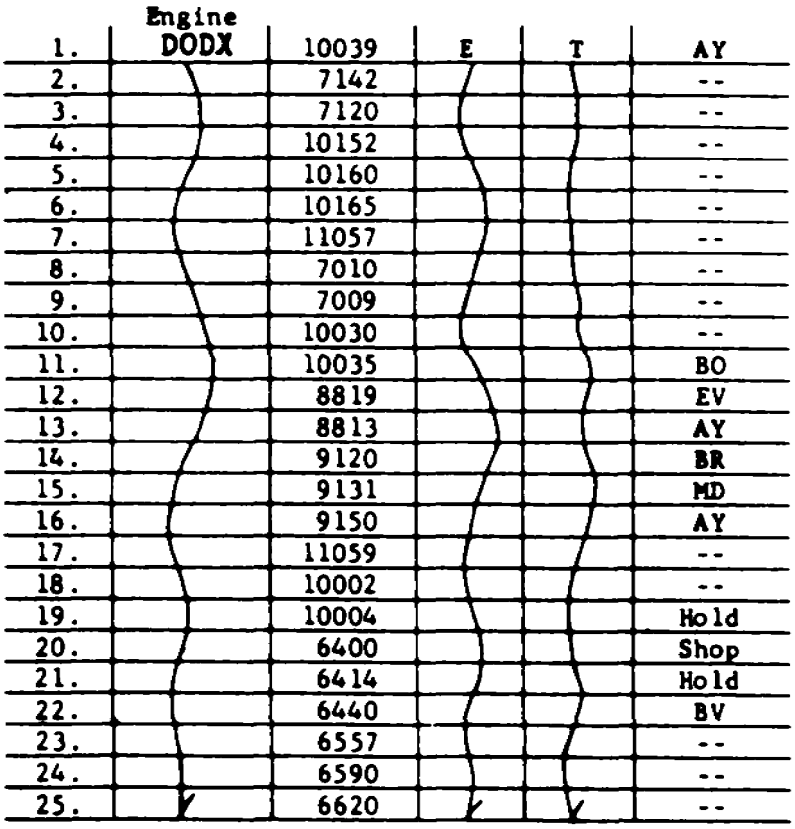
A. 6440, 6557.
B. 10002, 10004.
C. 9150, 11059.
D. 10030, 10035.

4 41. How many tracks will you need, so that not more than one group will be on a single track?

A. 13.
B. 10.
C. 8.
D. 5.

Weight

To be used with questions 40 and 41.



SITUATION

You are yardmaster at Conroy yard, and are preparing to switch track 5 shown in figure 2.3. You are not concerned with saving switching cuts or with making the freight ready for outbound movement. Disregard the cuts as they are shown and the track numbers in figure 2.3, and switch each group to a separate track, with the following exceptions:

a. All cars for destinations Bliss to Lily are Elwood locals, and go to track 14.

b. All OW and CP cars are a single classification and go to track 16.

REQUIREMENT

Based on the preceding SITUATION, answer questions 42 and 43.

Weight

4 42. How many individual switching cuts will you make to switch the entire train?

A. 32.
B. 30.
C. 28.
D. 25.

4 43. If you permit no more than one grouping to be switched to any one track, except as noted in the preceding situation, how many tracks will you need to accommodate the various blocks of the entire train?

A. 16.
B. 14.
C. 11.
D. 8.

LESSON ASSIGNMENT SHEET

TRANS SUBCOURSE 636.....Rail Operations, Yard.

LESSON 3.....Yard Personnel.

CREDIT HOURS.....2.

TEXT ASSIGNMENT.....Reference Text 636, pars. 3.1-3.10.

MATERIALS REQUIRED.....None.

LESSON OBJECTIVE.....To enable you to describe the duties and functions of personnel assigned to a rail yard.

SUGGESTIONS.....None.

EXERCISES

Weight — True - False

(On the answer sheet mark "X" under A for true or under B for false.)

2 1. The movement of cars from one railroad to another is called interchange.

2 2. The head brakeman of a yard crew is also known as the fireman.

2 3. Occasional delays of short duration to main-track trains do not usually have serious consequences, but delays to yard operations are almost never made up.

Cluster True - False

(Each of the following groups of questions is related to the statement that immediately precedes the group. On the answer sheet, indicate which are true and which false with respect to the statement by marking "X" under A for true or under B for false.)

Weight

FIRST GROUP

From your study of the duties and responsibilities of the yard switching crew, you have learned that:

2 4. Shifting of cargo may occur if cars are kicked too hard.

2 5. Rough handling of cars containing bulk commodities may result in dropping lading to the ground.

2 6. A crew can cross a main-line track with a switch engine without prior dispatcher permission if the timetable shows that no through trains are due within 15 minutes.

2 7. On clear tracks, cars should be driven in as far as possible.

2 8. Time may be lost when cars are not kicked hard enough.

2 9. Since the brakemen do not have copies of the switch list, the conductor gives them oral instructions about track numbers before each cut is switched.

SECOND GROUP

Keeping the waybills in a bill rack makes it easy to:

2 10. Determine the track standing by leafing through the bills.

2 11. Write up the wheel report before a train is called.

2 12. Detect the presence of perishable freight.

2 13. Determine the number of clear tracks.

2 14. Compute the tonnage of any track.

THIRD GROUP

Yard crews may often reduce delays by:

2 15. Waiting for cars that are temporarily held out.

2 16. Keeping in touch with the yardmaster.

Weight

2 17. Giving priority of movement at times to other crews.

2 18. Exercising good judgment and teamwork to accomplish the complete yard operation.

2 19. Coordinating their movements with other crews working near them.

Matching

In the following two groups of questions, match a person listed in column II with his duty or function in column I by marking an "X" in the proper space on the answer sheet. Items in column II may be used once, more than once, or not at all.

GROUP ONE

	Column I	Column II
3	20. Generally rides drafts being switched.	A. Engine crew.
		B. Fieldman.
3	21. Makes entries in car record book.	C. Head brakeman.
3	22. Answers whistle signals of main-track trains.	D. Outbound clerk.
		E. Inbound clerk.
3	23. Checks outbound trains against waybills.	
3	24. Lines lead switches for switching cuts.	

GROUP TWO

	Column I	Column II
3	25. Keeps the journal current.	A. Train conductor.
3	26. Studies consists for planning purposes.	B. Dispatcher.
	(cont.)	(cont.)

Weight

	Column I	Column II
3	27. Grants permission to cross main-line tracks.	C. Car inspector. D. Yardmaster.
3	28. Supervises clerical personnel.	E. Fieldman.
3	29. Is responsible for wheel report.	

Multiple - Choice

(Each question in this group contains one and only one correct answer. Make your choice by marking "X" in the proper space on the answer sheet.)

4 30. The bill rack is one of the most important elements in a yard office because it:

A. Takes priority over the journal.
B. Tells the complete story of what is outlined in the journal.
C. Is the authority for determining the clear tracks on which trains may be ordered into the yard.
D. Is used only by the yardmaster, and therefore it is accurate at all times.

4 31. C & O gondola 23801 would be entered on which page of a car record book?

A. 01.
B. 9-1.
C. 23.
D. 238.

4 32. It is possible to determine whether a car is being moved promptly by checking the:

A. Wheel report.
B. Train consist.
C. Junction stamps on the waybill.
D. Date on the track check.

Weight

4 33. If a crew completes a switching cut and has a car left over, the yardmaster should:

A. Have the conductor pick up each cut in reverse order until the error is discovered.
B. Determine from the waybill the block classification of the car and have it switched to the appropriate track.
C. Set the car on any convenient track, and correct the mistake just before the shift ends.
D. Switch the car to the hold track and make an appropriate notation in the journal.

4 34. Permission is granted for a switch engine to cross main-line tracks after a delayed first-class train clears. Before making the crossing, how long must the switch engine wait after the switches are opened?

A. 3 minutes.
B. 5 minutes.
C. 10 minutes.
D. No wait--cross immediately.

4 35. When an inspector checks piston travel, he is determining:

A. The braking force being exerted on the wheels.
B. The steam pressure necessary to move the train.
C. Whether the piston needs lubricating.
D. Whether the brakeshoes are too close to the wheels.

4 36. When stop signals are being relayed through two or more brakemen:

A. Signals should be given by the brakeman closest to the engine.
B. Signals should be repeated by all members of the crew.
C. Only the conductor gives signals in sight of the conductor.
D. Signals should be given a little in advance to allow for the delay in the engineer's seeing them.

Weight

4 37. Reweigh reports are necessary when:

A. Freight charges exceed the consignee's credit rating.
B. An inbound clerk misplaces a car's waybill.
C. Bulk-loaded cars have lost part of their lading.
D. A car has been on a hold track for more than 24 hours.

LESSON ASSIGNMENT SHEET

TRANS SUBCOURSE 636.....Rail Operations, Yard.

LESSON 4.....Safety.

CREDIT HOURS.....1.

TEXT ASSIGNMENT.....Reference Text 636, pars. 4.1-4.9.

MATERIALS REQUIRED.....None.

LESSON OBJECTIVE.....To enable you to apply standard practices governing safety in a rail yard and to identify some of the hazards that can be encountered in working on and around moving engines and cars.

SUGGESTIONS.....None.

EXERCISES

Weight		True - False
		(On the answer sheet mark "X" under A for true or under B for false.)
2	1.	The final responsibility for railroad safety rests with the individual.
2	2.	The main function of safety agents is instruction.
2	3.	Loaded cars of the open-top type may present hazards to yard workmen because of falling cargo.
2	4.	The prime objective of the safety department is to enforce the rules.

Weight | Cluster True - False

(Each of the following groups of questions is related to the statement that immediately precedes the group. On the answer sheet, indicate which are true and which false with respect to the statement by marking "X" under A for true or under B for false.)

FIRST GROUP

Which of the following are sound, safe practices for brakemen boarding, riding, or alighting from moving cars?

3 5. Alighting immediately after passing a switch stand.

3 6. Walking in front of a slowly moving car to adjust a knuckle or drawbar.

3 7. Riding inside empty boxcars or gondolas.

3 8. Boarding the rear end of a cut of moving cars.

3 9. Standing in the center of a car when riding the top.

3 10. Leaning back when passing a switch stand.

3 11. Working under cars when the track is protected by a red light.

SECOND GROUP

A yard conductor notices a blue light on the end of a track. This tells him that:

4 12. Cars or engines on the track must not be coupled to or moved.

4 13. If air inspectors placed the light on the track, only they are authorized to remove it.

4 14. The car inspectors have finished their work, and it is permissible for him to move the cars.

4 15. He may move cars if he can secure the yardmaster's permission to remove the light.

Weight

4 16. Cars should not enter the track.

4 17. Men may be working under cars.

THIRD GROUP

From the discussion pertaining to the danger of personal injuries when working on brake gear, you know that:

4 18. The air reservoir should be emptied.

4 19. If an angle cock is opened on either end of a train containing air, it will cause an emergency application of brakes.

4 20. To cut out a car in a train, both angle cocks should be open to prevent hand injuries.

4 21. A burst airhose will cause an emergency application of brakes.

4 22. Before working on a car containing air, both angle cocks should be opened.

FOURTH GROUP

From your study of telltales you have learned that:

3 23. They are effective only during daylight hours.

3 24. They are constructed of heavy wire.

3 25. Their warning is to get down at once.

3 26. They warn against close side clearances.

3 27. When brakeman is riding the top of a car, they strike him about the head and shoulders.

Multiple - Choice

(Each question in this group contains one and only one correct answer. Make your choice by marking "X" in the proper space on the answer sheet.)

Weight

4 28. The absence of fingers is no longer a sign of railroad experience because:

A. Automatic couplers have supplanted the old link and pin types.
B. Rule 108 is more strictly enforced.
C. Railroads have safety divisions to prevent accidents.
D. Red flags protect yard workmen during hazardous operations.

4 29. Which of the following signals commands the greatest respect among railroaders? A _____ light.

A. Yellow.
B. White.
C. Blue.
D. Red.

4 30. When getting off moving cars, a brakeman should remember that:

A. The left foot should touch the ground first if direction of travel is to his left.
B. If the speed is slower than 24 kilometers per hour, it makes no difference which foot touches first.
C. The left foot should touch the ground first, regardless of direction.
D. The right foot should touch the ground first if direction of travel is to his left.

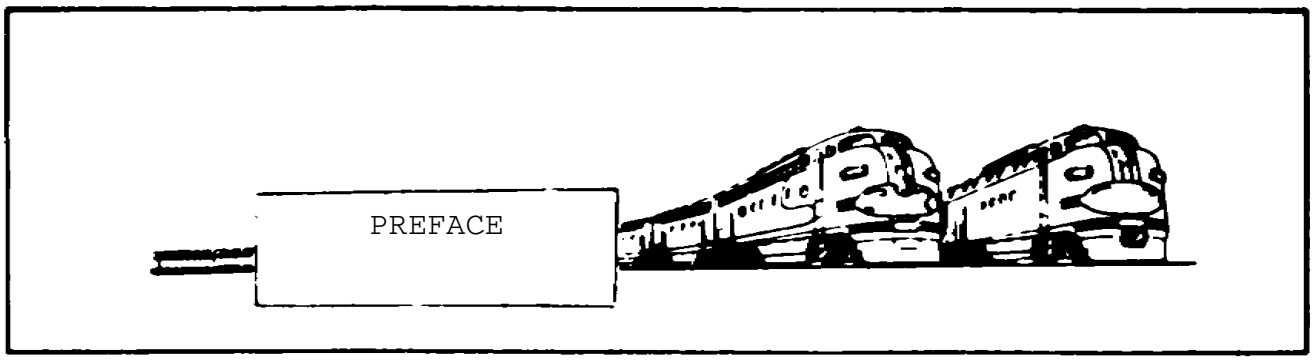
REFERENCE TEXT
636

RAIL OPERATIONS, YARD

The information contained herein is provided for instructional purposes only. It reflects the current thought of this school and conforms to printed Department of the Army doctrine as closely as possible. Development and progress render such doctrine continuously subject to change.

U. S. ARMY TRANSPORTATION SCHOOL
Fort Eustis, Virginia

Supersedes Reference Text 636, Rail Operations, Yard, November 1970.



Many freight and passenger trains move daily over the network of tracks of a large American railroad. The precision planning and unfailing teamwork necessary to make this movement have been fairly well publicized by the press and by writers who generally treat only the glamorous side of railroading. However, the task of moving the many trains shrinks materially when compared with the mammoth job that has been done by the numerous yards that switched these trains before they could go out on the main track.

This is the first of three related reference texts on rail operations: this one on yard, T-637 on main line, and T-638 on dispatching. Much of the information in the three texts has been drawn from civilian railroads, but these same operating procedures would probably be found on military railroads in a theater of operations. Sound railroading practices do not vary from railroad to railroad, or from a military to a civilian railroad, though the titles of individuals may differ.

Rail transportation is important to military operations, not only in this country but wherever the Army may be. In oversea theaters of operations, military railroads are operated by transportation railway service (TRS) personnel who, in the United States, have worked on civilian railroads and received their military railroading experience on the Army's training railroad at Fort Eustis, Virginia.

The information presented here will not make you a skilled railroader. You may, however, use it as a foundation on which to build your knowledge of practical railroading. An understanding of the grouping of freight in a yard will afford a better understanding of the methods employed in the movement of trains out on the road.

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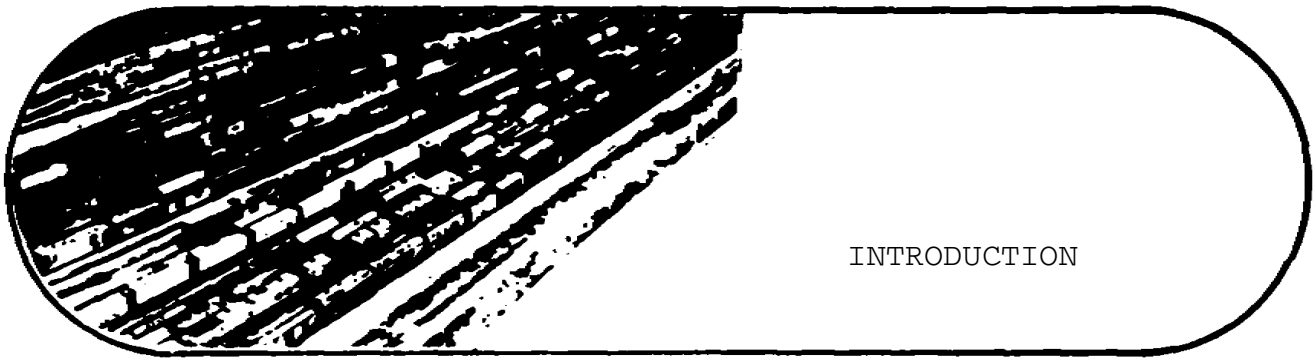


INTRODUCTION

Railroaders tell the story of an inexperienced yard clerk who once hesitated when told to check a track of 125 cars on the grounds that he had just checked the track a short 2 hours before. He explained later that he thought the yardmaster was merely trying to keep him busy. Being new at railroading, he did not know or understand the circumstances that made the second check of the track necessary.

The train he had checked contained a center cut of 65 cars for one destination, and 30 cars of mixed freight on each end. The yardmaster had known of the train's consist 3 hours before it arrived, and when it was still an hour away, he had called a road crew to be ready to move the 65 cars to the next division terminal. Because a 125-car minimum existed for each train, it was necessary to ready 60 additional cars for movement. Accordingly, the yardmaster planned to spot and air test 2 tracks of 30 cars each, one group belonging on the head end of the 65 cars, and the other group on the rear end.

When the inbound train was ordered into the yard, instructions were given the engine crew to spot the train at the air plug. The air inspectors tested the air on the 2 tracks of 30 cars each. After the inbound train stopped, the car inspectors looked the train over for defective cars and the air inspectors tested the air. These operations were simultaneous. The yard crews then removed the mixed freight from each end and substituted the 2 cuts of 30 cars each that had previously been tested. Upon a successful terminal air test by the outbound road engine, the train would be ready to depart. However, it was necessary to check the entire train to determine that the 30 cars on each end matched the waybills and that they were of the proper classification grouping.

It is understandable that the yard clerk thought he was being imposed upon. He had no knowledge of the foregoing, and he probably would not be alone in his failure to understand. Railroad men with years of experience in nonoperating departments might

be inclined to wonder just what was happening if they were to visit busy rail yards. While the back-and-forth switching of a flat yard appears to be rather commonplace, the overall job represents a complicated and highly specialized business. Trains must be taken into the yard and inspected; cars are classified and switched; cars or cuts of cars are doubled together according to their destinations or commodity to form trains and sent out of the yard in time to make room for additional arrivals.

This text explains the methods and facilities used in switching and classifying cars. Freight operations are discussed, but the same principles apply generally to the handling of passenger trains. Chapter 1 explains yard layout and tracks; chapter 2 discusses freight grouping and switching cars; chapter 3 covers the duties of yard personnel; and chapter 4 discusses safe working methods and safety rules.

A glossary of terms peculiar to railroading is provided as appendix II to this text. Other terms with similar meanings are in use among employees of some railroads. However, those listed in the glossary are used throughout this text. Before beginning your study of the text, you should become familiar with the terms in the glossary and refer to them again whenever necessary.

Chapter 1

LAYOUT AND TRACKS

Railroad yards, it has often been said, are natural bottlenecks in the movement of freight from one geographical area to another. In theory, at least, cars may enter the receiving end of a yard as fast as they arrive. In practice, however, they can depart only as fast as the yard forces can inspect, repair, classify and switch, and double them according to their setoff order. Depending upon the density of traffic, the number of rail lines, and the geographical location, a yard may be one of three types: a divided, a progressive, or a combination. Each of these has certain characteristics and facilities that distinguish it and, to a great extent, determine its operation. The three types of yards, along with their characteristics and facilities, are discussed in this chapter in the order mentioned.

1.2. DIVIDED YARD

Most railroads with a double-track main line divide and designate their yards according to the direction of movement of trains in either direction. This is called current of traffic, and is usually specified by timetable. Since many railroads run in an east-west direction, typical divided yards are east and west yards. Freight moving in a westerly direction enters the west yard; eastbound freight is handled in the east yard. Freight arriving or originating in a yard opposite to its direction of travel is switched to the opposing yard by yard crews. Terminals located on a single-track line may not have separate yards; however, usually a section of yard tracks is used for westbound freight and a similar section for eastbound cars.

1.3. PROGRESSIVE YARD

An ideal arrangement at busy terminals is a progressive yard with a further division of both east and west yards. Each is

subdivided into three yards: receiving, classification, and departure. Figure 1.1 illustrates such an arrangement.

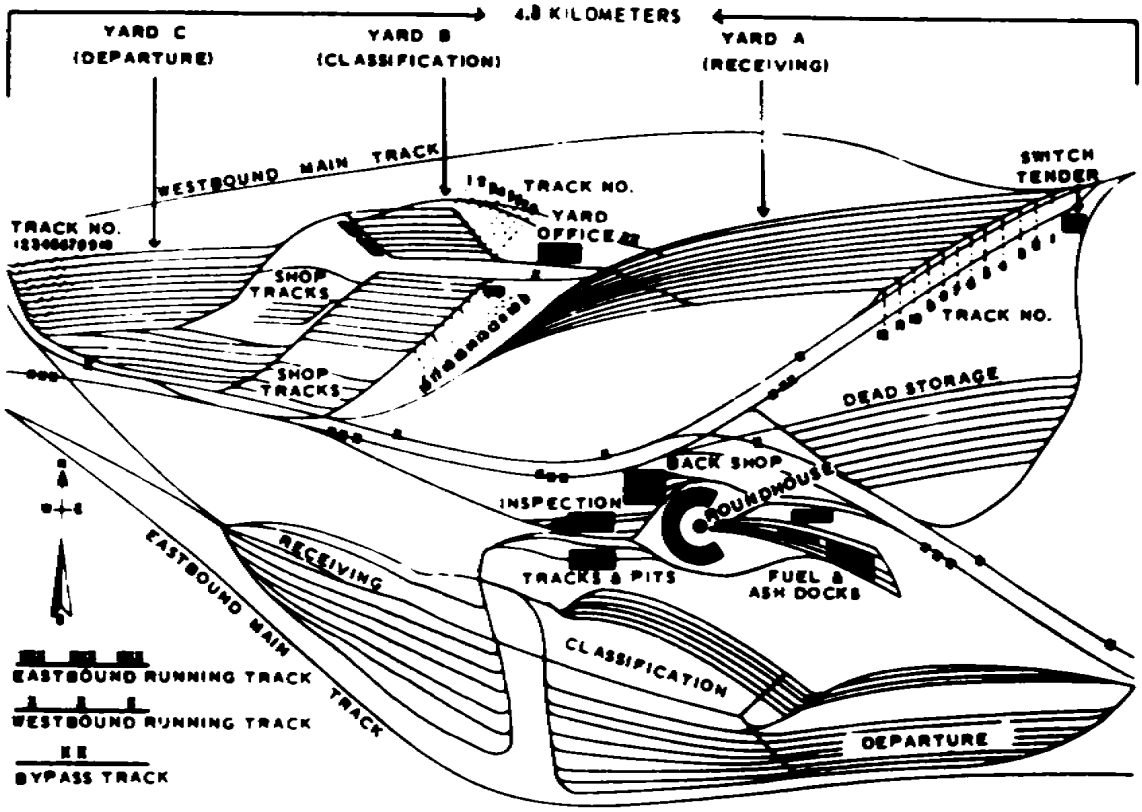


Figure 1.1. Typical Progressive Yard.

a. Receiving yard. Inbound trains from the westbound main line pull into the receiving yard marked A in figure 1.1. Yard clerks make a track check by recording the car initials, numbers, and seal numbers, while car inspectors examine the cars for defects. Switching lists are prepared from the track check when it is completed.

b. Classification yard. When a train is ready to be switched, a yard engine shoves the train out on the switching lead between yards A and B shown in figure 1.1. The individual cars or groups of cars are then switched to the various tracks in yard B, the classification yard, according to a switching list that specifies the track number for each car. The classification yard is frequently a hump yard that contains an artificial hill over which the cars are pushed. Gravity causes them to roll down the leads, and switchtenders line the switches to permit cars to enter their proper tracks. Speed is controlled by yard brakemen, or car riders, who ride the cars and manipulate the handbrakes. Or car retarders

may be installed which mechanically grip the wheel flanges of moving cars and create friction to reduce speed. When car retarders are used, switchtenders usually are not employed. The retarder operators, generally stationed in towers, open and close the switches by electrical control. Hump switching is faster than the older back-and-forth (flat-yard) switching because the movement is continuous and in a forward direction only.

c. Departure yard. When tracks are filled in yard B of fig. 1.1, cars are moved to the departure yard, C. When enough cars accumulate on a track in yard C, an outbound road crew is ordered to move the train to the next division terminal. Or when sufficient cars of the proper classification accumulate on various tracks, they are doubled together as described in chapter 2, paragraph 2.8.

d. Advantages. The principal advantage of the progressive yard is the reduction in delays to both yard and road crews. When a road train stops in yard A, the engine may proceed immediately to the running track and then to the roundhouse. If switching were in progress on this lead, the yard engine would have to stop operations, pull up to clear the running-track switch, and thereby lose valuable time. The same situation would prevail if road trains were departing from the classification yard. Here, delay to a switching crew would be considerably greater. A slow-starting train might block the lead for as long as 15 minutes. Should the train be delayed in getting dispatcher permission to head out on the main track, the loss of time could be much greater.

1.4. COMBINATION YARD

Railroads frequently incorporate the receiving, classifying, and departure facilities into one yard. This may result from insufficient volume of work to justify three separate yards or from a lack of land to expand the yard layout. In combination yards, the number of tracks depends on the volume of traffic, and track length is determined by the established length of inbound and outbound trains. These yards are generally flat, and switching is done by the back-and-forth movement of a yard engine with cuts of cars. In a combination yard, it is impossible to arbitrarily assign specific tracks for receiving only. Road trains must be taken into the yard without delay to prevent blocking the main track. Just which track is used is a decision for the yardmaster. In a crowded yard, he may be forced to accept a train on any track able to accommodate

it. He may find it necessary to use two tracks if the clear ones are too short. A typical combination yard is shown in figure 1.2. The longer tracks shown at A are used interchangeably for inbound and outbound trains and the remaining tracks for classification.

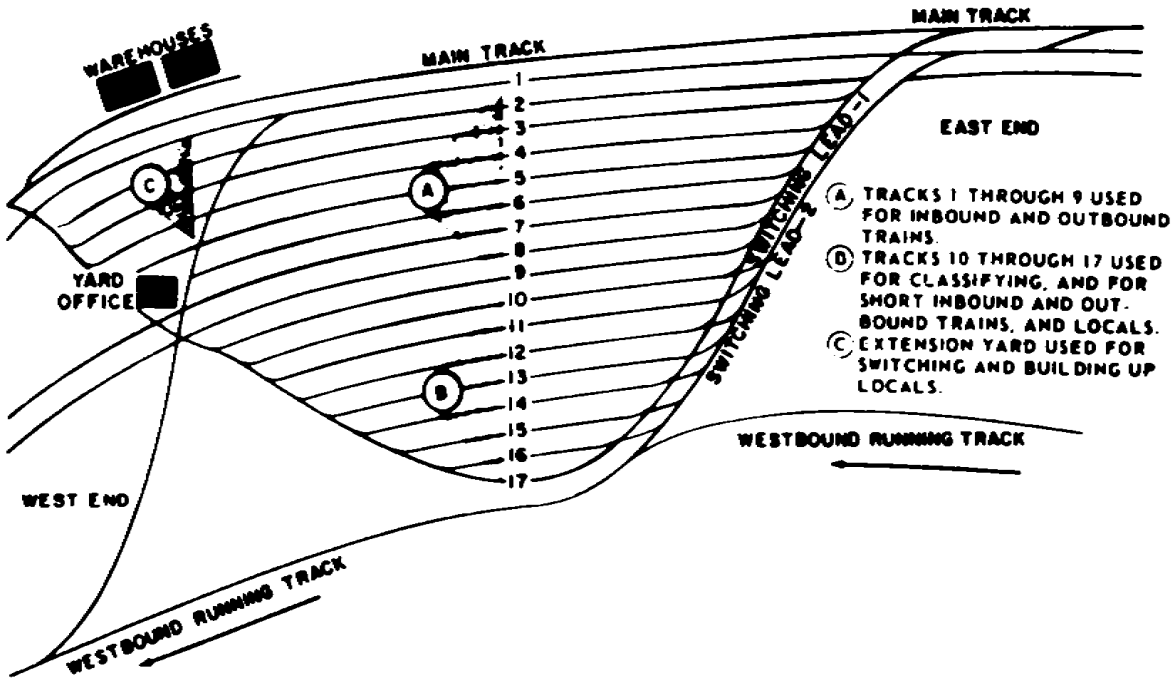


Figure 1.2. Typical Combination Yard.

1.5. TRACKS AND YARD CHARACTERISTICS

To speed up all phases of yard work, certain tracks are desirable and necessary. These include main tracks outside the yard tracks, divided leads, running tracks, switching leads, and sufficient track length. Each of these is explained in a separate subparagraph in the order mentioned.

a. Outside main tracks. With the main tracks outside the yard tracks as shown in figures 1.1 and 1.2, time may be saved in switching cars. If a main track separates a main yard from an auxiliary yard, or an east one from a west one, crews are delayed in crossing from one yard to another. Yardmasters have no control over the main tracks, and the dispatcher's permission must be gotten before the crews cross. Should a yard crew with 30 or 40 cars find it necessary to cross main tracks, the switching lead and consequently the entire switching operation may be tied up for 15 to 30 minutes depending on main-line traffic. An ideal arrangement is to have the main tracks located several kilometers from yards or yard tracks. While a main track with a low train density

may not restrict yard work greatly, one with a high density of traffic may delay yard operations to the extent that it would be advantageous to relocate the main track.

b. Divided leads. A desirable arrangement is to have divided leads at each end of a yard. This enables two yard crews to work at the same time. Where only a single lead exists and two crews are employed, one crew generally couples cars and makes room on tracks, while the other uses the lead in switching cars.

c. . Running tracks. Usually extending the entire length of the yard, running tracks provide a route of travel to any point in the yard independent of the switching leads and classification tracks. Such an arrangement is shown in figure 1.1. When two running tracks exist, they are assigned directional designations such as eastbound and westbound. Most railroads permit road and yard crews to use these tracks without prior yardmaster permission, provided their movement is in the direction specified by the track designator. With the exception of yard facility tracks, discussed in paragraph 1.6, running tracks are generally the only ones that may be used without getting permission from the yardmaster.

d. Long leads and approaches. Providing access, by switching crews, to any track within a yard, switching leads must be of sufficient length to accommodate the cuts or drafts of cars normally handled in the particular yard. They also lead out of the yard to running tracks or to the main line. Long approaches to the switching leads are desirable so that yard crews can move long cuts of cars from one track to another.

e. Track length. Tracks should be long enough to accommodate inbound and outbound trains without doubling, or moving cars off one track and coupling to cars on another. If a 100-car train enters a yard on a track capable of holding only 65 cars, it is necessary to double 35 cars to another track and to block the lead while making the double. This frequently delays yard crews switching cars on the lead. If an outbound train is built up on two or more tracks of limited length, delay will occur in doubling the train. On the other hand, when the train is on one track, the air test, which can be made only after the train is complete, is made before the train moves out to block the lead. Furthermore, pusher engines may be used to help reduce the delay by pushing the train out of the yard.

1.6. OTHER YARD FACILITIES

In addition to the tracks and leads necessary for receiving and classifying cars, numerous others are required in large-scale yard operations. These include tracks for repairing rolling stock (cars) and servicing motive power (locomotives), and those for miscellaneous use; they are discussed in the subparagraphs that follow.

a. Repair track. In a large yard, numerous tracks are required for repairing cars. Light and heavy repairs are made to loaded and empty equipment passing through the yard, and complete rebuilding facilities are usually maintained by railroads for their own equipment. Generally, light repair tracks (rip tracks) exist, in addition to transfer tracks where the freight is transferred to other cars to prevent lengthy delays caused by heavy repairs.

b. Tracks for servicing locomotives. Tracks necessary for servicing locomotives include inspection tracks and pits, and tracks leading to the turntable and roundhouse, sand house, fuel and water stations, and ash pit if steam locomotives are used. After being serviced and supplied with all needed equipment, locomotives are placed on a ready track to await their turn to take a train out on the road.

c. Miscellaneous tracks. A rail yard may contain tracks for cabooses and wreck trains, live- and dead-car storage, and work-train equipment. Also, often necessary are tracks for storing fuel and sand, and ties, rails, and other maintenance of way equipment. If a railroad handles livestock and perishable freight, it must have facilities for feeding, watering, and resting livestock, and for re-icing refrigerator cars containing perishable shipments.

1.7. USE OF PROGRESSIVE AND COMBINATION YARDS

The layout of a progressive yard of a large rail terminal, shown in figure 1.1, incorporates some of the desirable tracks previously mentioned. Both east and west yards are divided into receiving, classification, and departure yards. In the combination yard shown in figure 1.2, the receiving, classifying, and departure tracks are incorporated into one yard. The following subparagraphs illustrate how these yards can be used and the advantages they offer.

a. Through trains. In most yards, there are occasions when inbound trains do not have to be switched. Such trains require only an inspection, the usual clerical work on waybills, and a change

of crews. Should these trains require expedited movement, and if main-line traffic permits, they may be inspected on the main track and forwarded without entering the yard. However, if they do not require expedited movement, trains of this type may be handled in the progressive yard illustrated in figure 1.1 as follows:

(1) The train would be brought into the receiving yard (A) on any track from 1 through 3.

(2) It would head through its track out onto the lead and through the bypass track, marked XX, into the departure yard on any track from 1 through 10.

(3) The train would be inspected, checked by a yard clerk, and air-tested. If no defective cars were found, the train would be ready for forwarding without switching.

b. Two-crew switching. In the combination yard illustrated in figure 1.2, tracks are used interchangeably. Note that the tracks are numbered 1 through 17, and that two switching leads are shown on the east end of the yard. Assume that two yard crews are switching cars on these leads. Crew No. 1 uses lead 1, and crew No. 2 works on lead 2. If crew No. 2 has cars for tracks 1 through 10, it cannot switch them without delaying the other crew. The reverse situation prevails if crew No. 1 has cars for tracks 11 through 17. The yardmaster must, therefore, exercise good judgment in assigning various switching cuts to the two crews. To crew No. 1, he assigns a cut of cars intended primarily for tracks 1 through 10. To the other crew, he tries to assign cars which belong predominantly on tracks 11 through 17. However, each crew has some cars belonging on the other's tracks. These cars are held out temporarily on any track with enough room. When both crews finish with the other cars, they exchange the ones belonging to each other, and complete the switching. Or, to prevent any possible confusion, they could exchange places on the leads, and switch to the correct tracks the same cars that they had previously held out.

c. Advantages. Note that time is saved in both examples presented in subparagraphs a and b. In the situation described in subparagraph a, the road train may bypass a train on the lead marked X, near the yard office in figure 1.1. The through train, unassisted, is able to proceed to the departure yard, thus saving the time of a yard crew which would otherwise have to move it were the train left in the receiving yard. The employment of two switching crews, working as outlined in subparagraph b, also saves time. Frequently, switching a track as rapidly as possible results

in a clear track for the next inbound arrival. Without a clear track ready, the yardmaster would be forced to hold a road train on the main track and possibly delay a first-class train.

1.8. SUMMARY

A railroad yard is a place where cars are received, classified, and assembled for departure. Regardless of the type of yard--divided, progressive, or combination--or its physical layout and characteristics, the chief objective of any railroad is to receive, classify, and forward freight as quickly as possible. Unless built in the last decade or so, few yards will be encountered, either in the continental United States or in foreign countries, that are set up ideally. Most have expanded with the increase of freight and passenger traffic without regard for, or foreknowledge of, their eventual requirements and uses. A military railroader's job in a theater of operations is to survey the facilities to be operated and determine how best to realize their maximum usefulness. The foregoing study of yards and their characteristics and facilities should place a military railroader in a better position to carry out such an assignment.

Chapter 2

YARD WORK

2.1. GENERAL

The fundamental purpose of a yard is to receive inbound trains, to remove and add such cars as may be necessary, and to make up new trains consisting of various car combinations of groups received and groups on hand. This chapter deals wit the procedures involved in getting this work done.

2.2. FREIGHT GROUPING

The governing principle throughout the grouping or blocking process is to group each cut of cars so that its position in the outbound train requires a minimum of handling in setting it off at its destination, or at the next yard. For example, suppose the yardmaster at Conroy yard, shown in figure 2.1, receives an inbound train of 28 cars; the first 14 are bound for Maxey yard, and the last 14 are for Dewitt. On hand in his yard are 14 cars bound for Elton. He orders the train to a particular track in the yard where either the 14 Maxey or the 14 Dewitt are cut off and set over against the 14 Elton. The 28 cars, 14 Maxey-14 Elton, if the move is made at the head end, or 14 Elton-14 Dewitt, if the work is done at the rear end, are then doubled back against the other 14 inbound cars. The train is now complete with three blocks or groups of 14 cars each, one group each for Maxey, Elton, and Dewitt, and each group is in it proper order in the train. On arrival at Maxey yard, the first 14 cars behind the locomotive are set off. The same operation is repeated at Elton and Dewitt. This is a greatly simplified example of the application of the car grouping principle. In actual operations, train break-up and make-up is greatly complicated by numerous groups and destinations ordinarily involved.

2.3. CLASSIFICATION

Classifying cars consists of assigning them to a particular destination grouping, and switching them to a track containing the

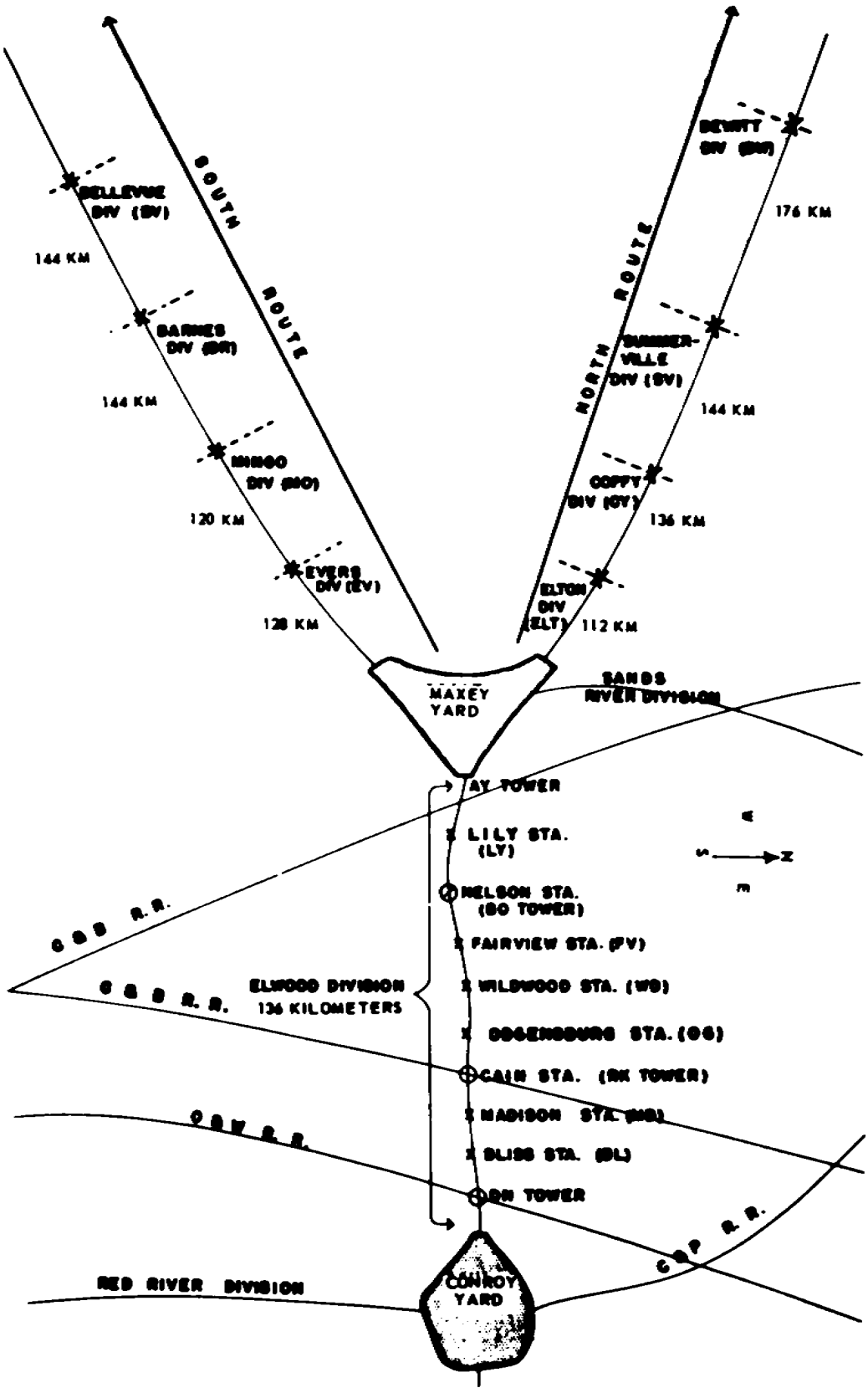


Figure 2.1. Typical Grouping Area.

particular destination grouping, and switching them to a track containing the particular group. When enough cars accumulate, either of one group or a combination of groups, an outbound train is ordered. Cars consisting of several groupings or blocks are set into the train in the order that they will be set off along the route. The first block to be set off is placed immediately behind the engine, followed by the next setoff grouping, and so on.

Having the blocks placed directly behind the locomotive involves the least expenditure of movement in setting them off. In special cases, there are exceptions to this sequence. For example, occasionally, a group of expedite cars may be carried next to the engine-a location where they would be out of their normal standing. Their position would enable the yardmaster at the receiving terminal to remove them from the train before car inspectors blue-flagged the track (discussed in chapter 4) on which they arrived. The cars might then be placed on the heed end of a departing train-again out of their normal standing--and handled identically at the next division terminal. They would be kept on the head end of all trains handling them until they arrived at their destination. This method may save as much as 48 hours over an 800-kilometer haul. It might be equally convenient to have a setoff at either end of the train in a yard where engine and caboose are to be changed. There might be other exceptions, but ordinarily, the preceding sequence prevails.

2.4. TYPICAL GROUPING AREA

Look back at figure 2.1 and note that it represents a large section of railroad resembling a Y. Conroy yard to Maxey yard, a distance of 136 kilometers, makes up the Elwood Division. For study purposes, this division has been enlarged to show the various stations along its route. Note that beyond Maxey yard, only divisions have been designated. No way-station details are shown, since they would only repeat the general pattern given on the Elwood Division. The south route at the upper left in the figure consists of four divisions as does the north route.

2.5. GROUPING DESIGNATORS

Note the abbreviations given in parentheses of the various cities, towers, and areas shown in figure 2.1 between Conroy and Maxey. Cars in

Conroy yard destined to Cain are marked RK, and cars for Maxey yard and the Sands River Division are marked AY. Cars destined to points beyond Dewitt and Bellevue are DW or BV freight because these areas represent the last groups for which Conroy is responsible for specific grouping.

2.6. ADVANCE GROUPING

Usually, freight arriving or originating in Conroy should be switched according to destinations from Conroy to Maxey only. All freight destined for points on or beyond either fork of the Y would be AY freight and forwarded by Conroy to Maxey yard in a mixed state. A mixed freight train is one that has not been built up in station order; also, it is one that contains both passenger and freight cars. Or it is possible that Conroy yard might have, apart from detailed grouping on the Elwood Division, only three other groups: north route, south route, and AY. However, assume that the yard facilities at Maxey are somewhat limited, while Conroy yard is a large consolidated terminal having receiving, classification, and departure yards, as shown back in figure 1.1, and a large work force. It would, therefore, be more economical to classify at Conroy yard all freight from Maxey to Bellevue and from Maxey to Dewitt. While several subgroups may exist within each of the eight divisions on the north and south routes of the typical grouping area in figure 2.1, no attempt is made at Conroy for detailed classification within the areas. The following subparagraphs further discuss the grouping of six typical trains.

a. The lineup or standing, which is simply the arrangement of the blocks or cuts of cars between engine and caboose, of six typical trains out of Conroy yard might be as follows:

1	2	3	4	5	6
Engine	Engine	Engine	Engine	Engine	Engine
2 BL	3 BL	11 AY	10 EV	15 AY	2 RK
2 MD	8 RK	10 MO	11 ELT	15 DW	3 WD
5 RK	5 OG	10 BR	10 CY	12 BV	4 FV
5 OG	2 BO	11 BV	11 DW	Caboose	6 BO
2 WD	2 AY	Caboose	Caboose	42 Cars	1 LY
3 FV	Caboose	42 Cars	42 Cars		2 AY
1 BO	20 Cars				2 DW
1 LY					Caboose
1 AY					20 Cars
Caboose					
22 Cars					

b. A check of the standings of the trains with figure 2.1 shows that trains 1 and 2 are local freights between Conroy and Maxey yards with setoffs at stations along the way. In actual practice, such trains would also pick up cars at stations for movements to points farther along the line. Each pickup would have to be cut into the train with a car or block bound for the same destination or in the correct order between blocks to insure its readiness behind the engine for setting off at the proper point along the route.

c. Train 3 consists of four blocks of cars all bound for Maxey yard and points beyond on the south route. It would move from Conroy to Maxey as a through train, and on arrival at Maxey, would become the responsibility of the yardmaster there. At Maxey, the groups may be separated from each other for makeup into new trains, but, except for bad-order cars, the blocks would not be broken up. Additional cars for the same destinations, however, would be added to appropriate blocks. Maxey yard to Evers now becomes an Evers Division operation. The yardmaster at Maxey decides, on the basis of the number of cars currently in his yard for south route destinations, what makeup is required for his outbound south route train or trains. If the consist of an arriving train were such that it could go on to the next division with little or no change, it would require only a fresh engine and crew. More often, however, it would be broken up and new trains formed. Remember that if Conroy yard had ample facilities and those at Maxey were limited, the grouping and makeup of the train at Conroy would be such as to require only a minimum of additional yard work at Maxey. In brief, the work is done wherever and to whatever extent crews and facilities exist. Ordinarily, this should be as close as possible to the point of freight origin.

d. Train 4 moves from Conroy to Maxey as a through freight. On arrival, the Maxey yardmaster might choose simply to cut off the 8 EV cars for inclusion in a south route train. He would keep all of the north route blocks together and add to them whenever necessary to conform to minimum train-size requirements. He would also provide a fresh crew and locomotive to move the train to Elton, the next division terminal on the north route.

e. Train 5 is also a through freight to Maxey. When it arrives there, it will be broken up and the blocks put into new trains for movement to final destination. Ordinarily, a train out of Conroy would not include blocks of cars for destinations on both the north and south routes, but in this example because the blocks are relatively large, it is better to keep them moving forward.

On some railroads, a minimum car limit for trains is observed. For example, some roads require a minimum number of cars or tons of freight in each train. Variations depend on rules of the particular road, the type of freight, type of motive power, and siding length. The general policy is to run slightly over the minimum, rather than make up trains of fewer cars or lesser tonnages. However, in a theater of operations, much shorter trains are the rule. Minimum car limits and tonnages are not primary interests.

f. Train 6 presents a situation quite different from that in the other trains. The 16 head cars are destined to local stations between RK and LY, and the remainder of the cars in the train are for AY and beyond. Ordinarily, this type of train is uneconomical to run because of the five local stops and the necessity of starting the heavy freight after each stop. Also, if traffic on the division is heavy, the frequent stopping and starting of the train might cause delay to other trains to the rear. However, a train such as train 6 might be run if the entire load was expedite freight and there was a severe shortage of crews. Also, during a period of depressed business on a civilian railroad, when no other trains were behind, such a train might be run. While train 6 is built up in proper order, under ordinary circumstances its operation would be impractical.

2.7. INBOUND TRAINS

Before an inbound train arrives in the yard, the yardmaster issues instructions directing it to a particular track. A switchtender lines the switches for the train's entry. When it comes into the receiving yard, two things are done before any switching of cars is undertaken. The train is inspected by car inspectors, and the yard clerk makes his track check to determine the standing of cars in the train. Ordinarily, these jobs are done simultaneously; they are discussed in the following subparagraphs.

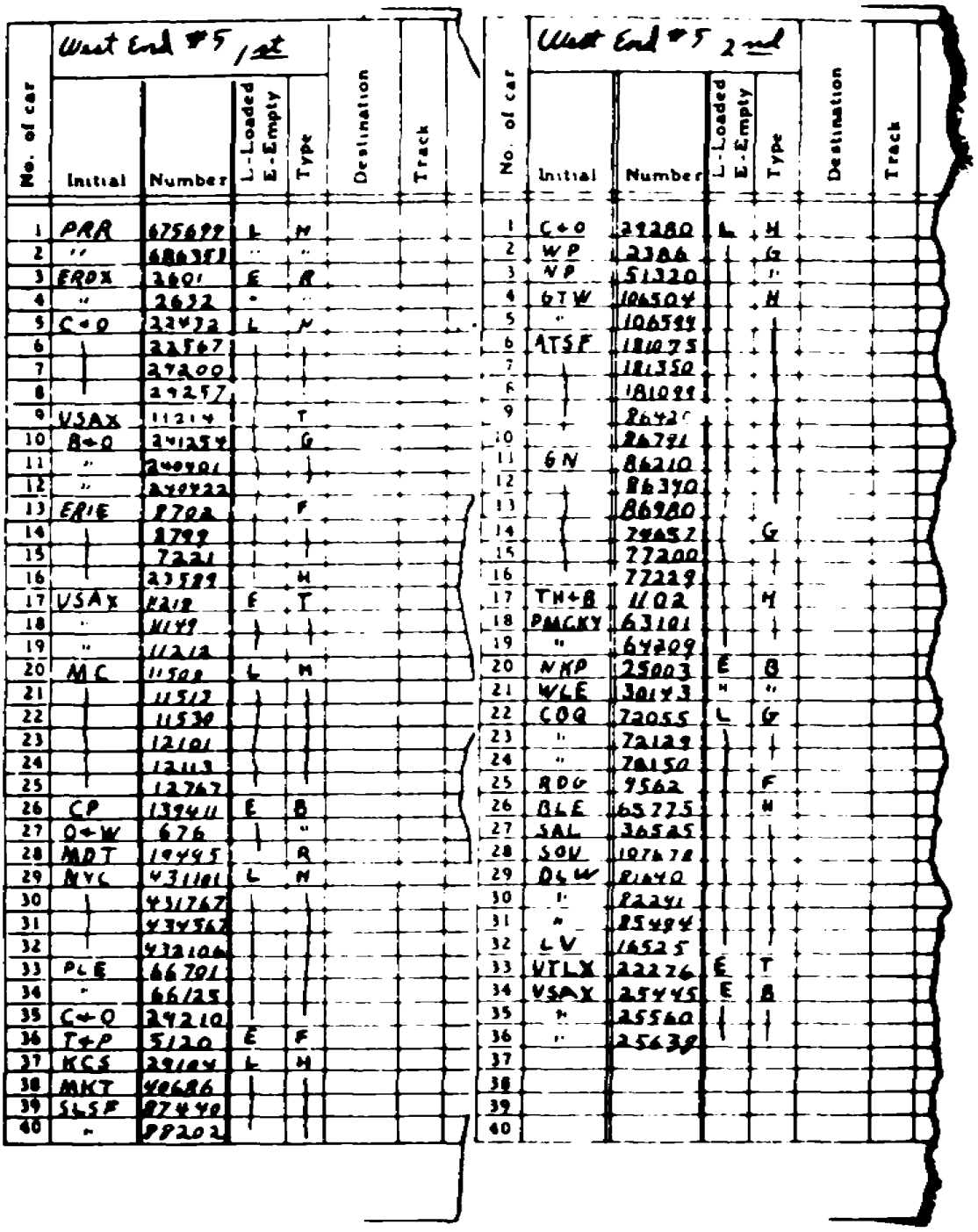
a. Inspection. After setting out their warning signal, blue flags by day or blue lights at night, to warn all yard crews that men are working on the cars, car inspectors start the immediate inspection of the train. On long trains, four inspectors may be used to good advantage. Two men, one on each side of the train, start working from the head end and two from the rear end. On completion of their inspections, they meet approximately at the middle of the train. They will have made a record of all defective cars and applied appropriate "shop" tags to all cars needing repairs.

A report of such cars is then furnished the yardmaster, and the blue flags are removed by the inspectors.

b. Track check. While the inspectors are going over the train, a yard clerk, usually called the outside clerk, is also busy. With a supply of blank forms, he moves along the train recording the initials and number of each car; whether it is loaded or empty; and its type such as box, tank, hopper, or flat. If any of the cars have seals, he also records the seal numbers, applies new seals where necessary, and makes a record of the seals used. This is called a track check. A sample form, as filled out by the yard clerk, is shown in figure 2.2. In this sample, no seal numbers are shown because those cars that ordinarily require seals, such as boxcars and refrigerator cars, are shown on the report as empty, and no seals are required. If they were required, an additional column could be drawn on the form in which the seal numbers could be recorded. The yard clerk may start his check at either end of the train, but he shows at the top of the form the end at which the check was started. As shown in the upper left-hand corner of the track-check form in figure 2.2, the yard clerk began his check at the west end, and the train is on track 5 in the yard as ordered by the yardmaster. The complete track check must be verified with the waybills, the authority for moving cars, to determine that there is a car for every waybill and a bill for every car. The bills should be lined up in the exact order that the cars stand in the train. In military railroading, freight waybills are used by transportation railway service personnel only when they are actually operating in oversea areas. Television cameras and video tape recorders are often used in the larger and busier commercial railroad terminals to perform both track and train checks.

2.8. SWITCH LIST

When a yard clerk has made all his entries on the track check form, it is turned in to the yardmaster, or his representative, who converts it to a switch list or makes up a switch list from it. This is done by adding the destination of each car, the number of the track in the classification yard to which it is to be switched, and the number and order of the cuts to be made in breaking up the train. Commercial railroads often utilize automated systems in developing switch lists. A track check of the train on track 5 that has been converted to a switch list is shown in figure 2.3. Since the switching engine could not handle the entire train in one operation, and because the length of an ordinary train would make such a move unwieldy and impractical, the train is simply divided into sections; each section, called a cut or draft, is handled separately.



West End #5 1st

No. of car	Initial	Number	L-Loaded E-Empty	Type	Destination	Track
1	PRR	675699	L	H		
2	"	686358	"	"		
3	ERDX	3601	E	R		
4	"	2632	"	"		
5	C&O	22472	L	H		
6		22567				
7		29200				
8		29257				
9	VSAX	11214		T		
10	B&O	241254		G		
11	"	240901				
12	"	249922				
13	ERIE	8702		F		
14		8799				
15		72221				
16		23589		H		
17	VSAX	11218	E	T		
18	"	11149				
19	"	112/2				
20	MC	11508	L	H		
21		11512				
22		11530				
23		12101				
24		12113				
25		12767				
26	CP	139411	E	B		
27	O&W	676		"		
28	MDT	19495		R		
29	NYC	431181	L	H		
30		431767				
31		434562				
32		432104				
33	PLE	66701				
34	"	66125				
35	C&O	29210				
36	T&P	5120	E	F		
37	KCS	29104	L	H		
38	MKT	40686				
39	SLSF	87440				
40	"	99202				

West End #5 2nd

No. of car	Initial	Number	L-Loaded E-Empty	Type	Destination	Track
1	C&O	29280	L	H		
2	WP	2386		G		
3	NP	51320		"		
4	GTW	106504		H		
5	"	106599				
6	ATSF	181075				
7		181350				
8		181099				
9		86420				
10		86791				
11	GN	86210				
12		86370				
13		86980				
14		29452		G		
15		77200				
16		77229				
17	TH&B	1102		H		
18	PMCKY	63101				
19	"	64209				
20	NKP	25003	E	B		
21	WLE	30193	"	"		
22	COQ	72055	L	G		
23	"	72129				
24	"	72150				
25	RDG	9562		F		
26	BLE	65775		H		
27	SAL	36585				
28	SOU	107678				
29	D&W	21440				
30	"	22241				
31	"	25494				
32	LV	16525				
33	VTLX	22276	E	T		
34	VSAX	25445	E	B		
35	"	25560				
36	"	25639				
37						
38						
39						
40						

Type of car should be abbreviated as follows:

AB--- auto box	SD--- single deck stock	F--- flat
B---- box	DD ---double deck stock	WF--well flat
C ---- cement	T---- tank	WP--wood pulp
DB-- drop bottom gondola	R --- refrigerator	CP--composite gondola
G --- gondola	H --- hopper	CN--container

(This legend would ordinarily be shown at the bottom of the above forms.)

Figure 2.2. Track Check of an Inbound Train.

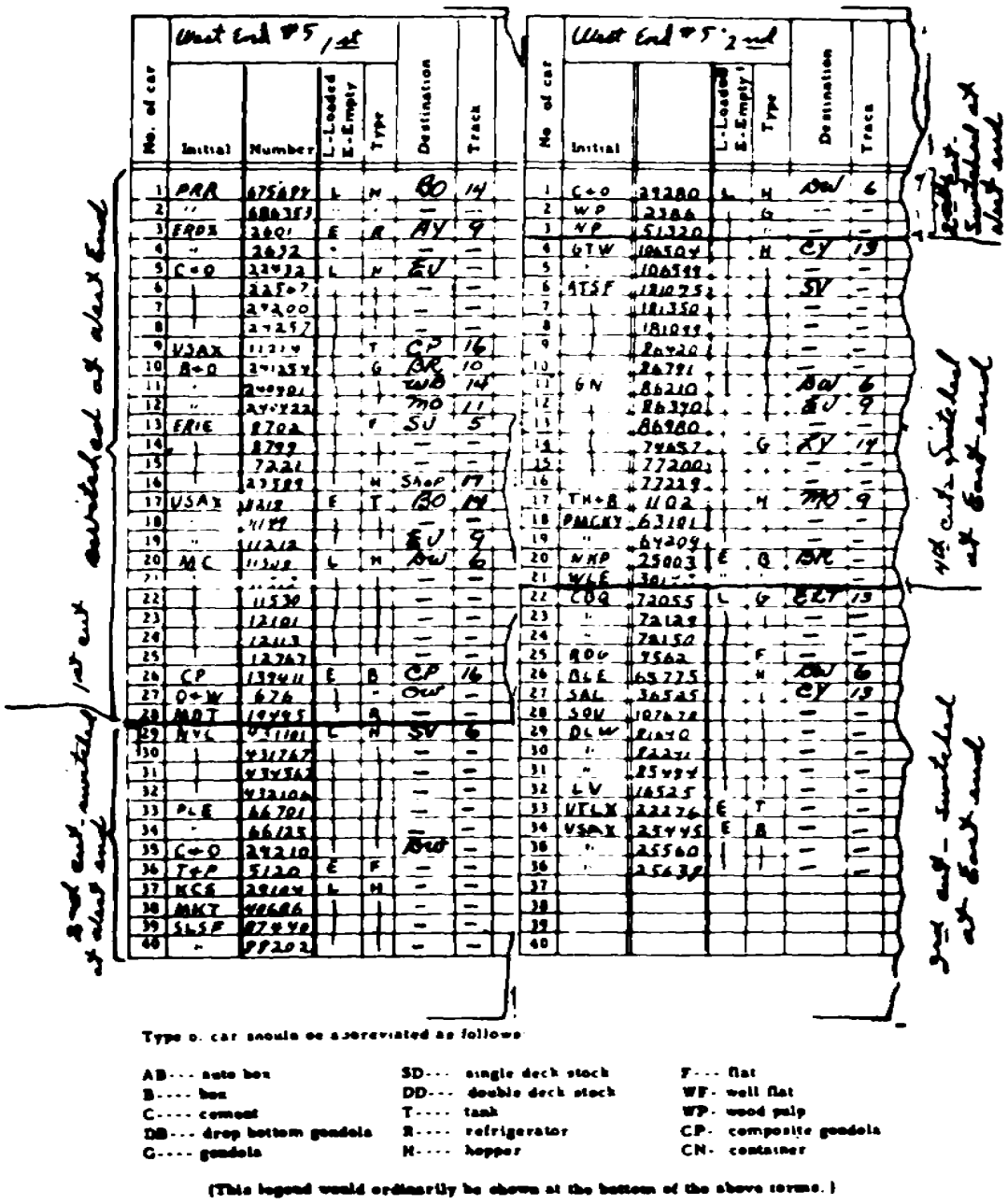


Figure 2.3. Track Check Converted to a Switch List.

a. Cutting a train. In making his cuts, the yardmaster always makes them at the beginning or at the end of a group or block of cars--ordinarily, the block is never broken. Generally, the cut is made at the end of a block to eliminate moving the block up and down the lead while cars ahead are being switched to their proper tracks. The blocks of cars shown in the switch list in figure 2.3 for the particular train are NOT in proper order. This is not a violation of the grouping principle because the train was

received from a foreign road (one belonging to another company) and, to that road, all of the cars in the train were Conroy cars. Similar situations may be encountered in oversea theaters when trains are received from port areas. The necessity for rapid port clearance to prevent bottlenecks may require that trains be moved out of the port area with mixed car groupings for proper classification at the next yard on the line.

b. Determining cuts. The yardmaster's decision as to where the cuts will be made is based on five different factors.

(1) The number of cars that can be handled efficiently by the switching locomotives.

(2) The length of the lead track over which the cut must be worked.

(3) The number and destinations of cars already on the various classification tracks in the yard.

(4) The planned makeup of outbound trains.

(5) The fewest moves and the most efficient and time-saving method he can devise to do the job.

c. Cutting information provided by a switch list. In the completed switch list shown in figure 2.3, the yardmaster has decided that four cuts will be required. The list now shows the following:

(1) Where each cut will be made. This is shown by the heavy horizontal line drawn immediately below the last car in each cut. For example, the first cut will be made between MDT 19495 and NYC 431101.

(2) The order in which each cut will be handled.

(3) The end of the yard from which each cut will be switched. Both the switching order and the directional end of the yard are shown in the margin alongside each cut.

(4) The destination mark of each car group.

(5) The particular track number to which each car or block of cars will be switched.

d. Example of the use of a switch list. The details of the yardmaster's cuts for the train are as follows:

(1) Cut 1, as shown in the upper left-hand corner of figure 2.3, consists of 28 cars, starting with PRR 675699 and ending with MDT 19495. It will be switched from the west end of the yard.

(2) Cut 2 consists of 15 cars, starting with NYC 431101 and including the remaining cars in the bottom of the left-hand column of the list and the first three cars at the top of the right-hand column, ending with NP 51320.

(3) Cut 3 starts at the lower right-hand corner of the list because this cut is going to be switched from the east end of the yard and, therefore, starts from a position exactly opposite to that of cut 1. In this cut are 15 cars, starting with USAX 25638, which will be next to the switch engine, and ending with CBQ 72055.

(4) Cut 4 will also be switched from the east end of the yard. It contains 18 cars, starting with WLE 30143, which will be next to the switch engine, and ending with GTW 106504.

2.9. FREIGHT ON HAND

As previously explained, when planning the switching of any train, the yardmaster must keep in mind the freight on hand or the cars or blocks already on the various tracks in the yard. When a yardmaster reports for duty he checks the lineup of incoming trains and the cars already in the yard, and he immediately plans the outbound trains to be made up and run out of the yard to make room for inbound trains. The check is made from the yardmaster's journal explained in the following subparagraphs.

a. Yardmaster's journal. A detailed record, called a yardmaster's journal, is maintained to provide the information a yardmaster needs in planning the switching and making up of trains. The journal is a permanent record kept current by each yardmaster on each shift. The information it contains is discussed in the next subparagraph. It provides the yardmaster coming on duty with a written picture of the status of every track in the yard; he keeps it up to date to provide similar information to the yardmaster who relieves him.

b. Example of a yardmaster's journal. Figure 2.4 illustrates a page from the journal that might be kept for the combination yard shown back in figure 1.2. The actual form may vary among railroads,

Yardmaster: Lewis to Clark

West Yard ~~CONROY~~

Date 15 May 1968

Time 2300

Inbound Line-Up

Engine	Conductor	Cars	ETA
3076	Brown	76 (to switch) (60 north route)	2330
3220	Bristol	125 (50 south route) (15 miscellaneous)	0200
194	Sands	115 to switch	N.P.

1. Clear
2. Clear
3. Clear
4. Clear
5. Engine 3076 ordered in--76 to switch
6. 30 DW (east end)
7. 100 empty 70-ton hoppers (air OK)
8. Clear
9. 85 NW (coupled; at west end)
10. 10 BR (coupled)
11. 9 MO
12. Clear
13. 12 AX
14. 27 Elwood locals
15. 12 Red River
16. 14 CP-12 O W (mixed)
17. 12 Hold & Miscellaneous

Extension Yard

1. Clear
2. Clear
3.
4. Clear
5. 10 co. coal

Shop Tracks

1. 25 shops (spaced)
2. 18 shops (spaced)
3. 17 shops (unspaced)

Shop lead - clear

Regular Crews

Eng. 9330 Comdr. Frank (coupling #9 at west end)

Eng. 9332 Comdr. Williams (spacing #1 shop track)

Extra Crews

Eng. 9552 Comdr. Jones (at switch tenders; due off duty at 2330).

Extra crew due off dock at 0001. Will call for instructions.

Watch for and expedite these cars: NWT 19086; PFR 425003; SAL 19522. Car distributor promises to take the 100 mty hoppers about 0700.

Figure 2.4. Journal Showing Complete Yard Picture.

but basically all journals provide similar information and serve the same purpose. In a theater of operations, such journals are kept as simple as possible and they show only essential information. In addition to the name of the yardmaster, the terminal or yard name, the date, and the time, the journal also shows:

(1) A consist or lineup of inbound trains due in the next several hours. Three trains are en route, and the yardmaster notes the engine number, conductor's name, number of cars in each train, and approximate arrival time of each. The marking N. F. under the ETA (estimated time of arrival) means no figure; the dispatcher will estimate the arrival time later.

(2) The listing of every track in the yard, including cars and their contents, if any. The illustration in figure 2.4 shows that the first train in the lineup is ordered in on track 5.

(3) The status of every track in the yard. This includes whether the cars are coupled, whether they are at the east or west end, or whether the cars on the shop tracks are spaced or unspaced. An appropriate notation is also made if the air has been tested and OK'd on any track. See the notations on tracks 6, 7, and 9, and on the shop tracks.

(4) A list of the yard crews and locomotives that will be working during the oncoming shift, exactly what each crew is doing at the time the yardmasters change, or where each engine is awaiting relief. Yardmasters usually change shifts a half or full hour before yard crews change.

(5) List and consist of trains ready for departure.

(6) Other data pertinent to yard operations. Wide margins appear on that portion of the page that deals with the cars on tracks 1 through 17. This is to allow for the additional entries that will be made as work progresses and the picture of the yard changes. After 2300 hours, all cars switched to these tracks from the west end of the yard will be entered on the left side of those groups already shown on hand, and all cars switched in on the east end of the tracks will be entered on the right side. An illustration of this page with all entries posted is shown in figure 2.5 and should be consulted and checked after the following switching operation is completed.

5.	Clear
6.	9 SV + 9 + 6 + 30 DW (east end) + 1 DW + 1 DW
7.	100 mty 70-ton hoppers (air OK)
8.	Clear
9.	2 AY + 4 + 1 + 85 EV (coupled; west end) + 2 EV + 3 MO + 2 BR
10.	1 + 10 BR (coupled)
11.	1 + 9 MO
12.	Clear
13.	12 AY + 4 ELT + 10 CY + 2 CY + 5 SV
14.	2 BO + 1 WD + 2 BO + 27 Elwood locals + 3 LY
15.	12 Red River
16.	1 CP + 1 CP + 2 OW + 14 CP + 12 OW (mixed)
17.	1 Shop + 12 Hold & Miscellaneous

Figure 2.5. Part of Journal Page After Switching Track 5.

2.10. THE SWITCHING OPERATION

Two major sources of information are required to conduct the switching operation: the switch list and the journal. Figure 2.3, the completed track check switch list, provides all necessary information on the recently arrived train of 76 cars which is now on track 5. Remember that military trains in a theater of operations would ordinarily be much shorter than 76 cars. Although this example is based primarily on civilian operations, the principles taught are the same as for military railroading. Figure 2.4, the journal page, provides the detailed status of the classification yard. To enable you not only to visualize the operation, but also to move the various blocks of cars to the appropriate tracks, annex A is provided. This annex consists of two sheets that are explained in the following subparagraphs.

a. Sheet No. 1 is a layout of the yard in which you are working. Spread it out on some convenient working surface where you will be able to cut up your blocks of cars and move them as the operation proceeds. Most of the working information necessary for switching the train on track 5 has been printed directly on the layout. This includes the standing of all tracks at the time of the train's arrival and the block standing on the 76-car train ordered in on track 5.

b. Sheet No. 2 consists of four strips which are duplicate representations of the blocks or cuts of the 76-car train ordered to track 5. Note the numbered tabs at the bottom of the various blocks of cars. Cut out the four strips with the numbered tabs at the bottoms. Be careful to preserve the tabs, because the number on each represents the track number to which each car or group of cars will be switched. When the strips are cut out, line them up on track 5 in exactly the same order as the duplicate set printed on the lower border of the layout (sheet 1). You are now ready to break up the train. Also reproduced on sheet 2 are the typical grouping area, figure 2.1; track check converted to switch list, figure 2.3; and a sample page of the journal showing complete yard picture, figure 2.4. You will not be using the extension yard during this operation but only tracks 5 through 17.

2.11. BREAKING UP A TRAIN

Your yard layout now shows the cars on hand and the four cuts of the newly arrived train of 76 cars on track 5 which you will cut and move to their proper tracks. This is directed by the yardmaster, as shown on the switch list in figure 2.3, and reproduced on sheet 2 for ready reference. Although you must break up your train by switching one cut at a time, you should remember that, in regular yard operations, this train would probably be broken up by locomotives working from the west and east ends of the yard simultaneously.

a. First cut--west end. A glance at the track check shows that the first cut will be made from the west end of the yard. The locomotive is coupled to the first BO car at the extreme west end of track 5; the last car of the 28-car cut is an OW. Cuts will be made from the rear end of the draft and will be switched to the west end of the track designated. A check of figure 2.3 shows that the last 3 cars in the cut, 2 OW's and 1 CP, are listed to track 16. Cut them off the right side of your strip and place them on the west end of track 16 alongside the 14 CP and 12 OW (mixed). Continue

this operation, checking each move against the list, cutting your cars off the strip, and setting them on the proper tracks as follows:

6 DW to track 6.
1 EV to track 9.
2 BO to track 14.
1 SHOP to track 17.
3 SV to track 5. (Note that these 3 cars will be set against the 6 SV which are on the head end of the second cut. Later, the entire cut will be set over to track 6. This saves the yardmaster from having to provide a separate track for SV cars.)
1 MO to track 11.
1 WD to track 14.
1 BR to track 10.
1 CP to track 16.
4 EV and 2 AY to track 9.
2 BO to track 14.

You have now completed the switching of the first cut. Review it carefully with the preceding itemized list, the switch list, and the duplicate standing of the original train on track 5. Repeat any part of the operation about which you may be doubtful until you are completely satisfied that your switching is correct.

b. Second cut--west end. The second cut is also switched from the west end of the yard and will go in on the west end of the track designated. A check of the switch list shows a total of 15 cars in this cut. Remember, however, that 3 SV from the first cut were switched back to track 5. Therefore, the second cut will stand 9 SV and 9 DW, and 18 cars instead of 15 will be set over to track 6. Put these cars on the west end of track 6 and the second cut is switched.

c. Third cut--east end. The procedure from this point to the conclusion of the switching operation is now reversed in that you will be working from the opposite end of the yard. The locomotive is coupled to the first of the 10 CY cars, and the 4 ELT cars are the first to be switched. The switch list shows that they will go to track 13. Cut them off the left side of the tabbed strip, place them on the east end of track 13, and proceed, cutting the cars from the left side of the strip and placing them on the east end of the designated tracks as follows:

1 DW to track 6.
10 CY to track 13.

This completes the switching of the third cut.

d. Fourth cut--east end. The fourth cut is also switched from the east end of the yard. It consists of 18 cars, starting with 2 BR, to which the locomotive is coupled, and ending with 2 CY. The switch list directs that the 2 CY and 5 SV cars be switched to track 13. Cut these last 7 cars from the left side of your strip and place them on the east end of track 13. Thereafter, continue cutting the cars or blocks from the left side of the strip and placing them on the east end of the tracks designated as follows:

1 DW to track 6.
2 EV to track 9.
3 LY to track 14.
3 MO and 2 BR to track 9.

This completes the switching of the fourth and last cut of the train, and the breakup and classification operation is accomplished.

2.12. REVIEW OF TRACK STANDINGS

To insure that you have completed the switching operation accurately, check the standing of each track, starting with track 6 and reading from west to east left to right, with the summary given as follows.

Track 5	CLEAR.
Track 6	9 SV and 47 DW
Track 7	100 mty hoppers.
Track 8	CLEAR.
Track 9	2 AY, 92 EV, 3 MO, and 2 BR.
Track 10	11 BR.
Track 11	10 MO.
Track 12	CLEAR.
Track 13	12 AY, 4 ELT, 12 CY, and 5 SV.
Track 14	2 BO, 1 WD, 2 BO, 27 ELWOOD LOCALS, and 3 LY.
Track 15	12 RED RIVER.
Track 16	2 CP, 2 OW, 14 CP-12 OW (mixed).
Track 17	1 SHOP, and 12 HOLD & MISCELLANEOUS.

As previously mentioned in subparagraph 2.9b(6) additional entries are made in the journal to record the changing picture of each track in the yard as operations progress. Look back at figure 2.5 which shows the completed page of the journal after all entries have been made for the switching operation you have just finished. Notice that the cars which were switched to the east end of their

respective tracks are added on the right side of the original entries, and the cars added to the west end of each track are shown on the left side. The lineup for each track in the book is now exactly the same as the lineup of cars on each track in the yard.

This practice may vary from one railroad to another. For example, the usual practice is to have car standings on the left side of the page start with the cars closest to the yard office and to enter those farthest from the office on the right side of the page. However, some yardmasters may find it more convenient to make entries in a reverse manner. The method shown here is thought to be more practical for the yard illustrated in annex A.

Regardless of the method employed, the purpose is to keep an accurate record of each track in the yard at all times. If the entries shown on the journal page in figure 2.5 were the last to be made before a relieving yardmaster came on duty, the information would be transferred to a new page in the journal showing the totals of each track as shown in figure 2.4.

2.13. OUTBOUND TRAINS

To understand the extent of the yardmaster's planning for outbound trains, re-examine the switch list in figure 2.3 in its entirety. In the first cut, according to the freight groupings, there are 13 separate cuts. By counting the cuts in the track column, however, it is evident that the yardmaster has reduced this to 12. The second cut has two grouping classifications, yet no switching cuts were made in the handling; consequently, one cut was saved. In the third cut, time was saved by letting two groups go to one track. In the last cut, two switching cuts were saved by letting two groups go to track 13 and three groups to track 9.

The largest saving in time, however, is more apparent after the train is switched. Examine track 9 on annex A, sheet 1, and note that by comparing the train standing with the typical grouping area on sheet 2, the train is in proper station order. By doubling the cars on track 13 to the west end of track 6, and those on track 10 so the east end of 6, another train is made up. If the yardmaster had used separate tracks for cars of the MO, BR, SV, ELT, and CY classifications, numerous doubles would have been necessary before the two trains would be ready. Doubling of tracks means handling cars twice, which often delays other crews in the second handling. While doubling of tracks cannot be eliminated entirely, it can often be substantially reduced by employing a little foresight.

2.14. LOCAL FREIGHT BUILDUP

Handling local cars and building up local trains is almost identical to the method used by a post office in gathering, sorting, and delivering mail. Assume that a city street is 89 blocks long. Bundles of mail come to the sorting table and a clerk sorts the mail into the various pigeonholes in a mail rack. One pigeonhole may be devoted to this particular street and for several hours all mail addressed to this street is put in the appropriate pigeonhole without regard to house numbers. Before the carriers are scheduled to leave, the mail in the box is sorted again, and now, according to house or block numbers. If 6 letter carriers cover 15 blocks each, the mail would be sorted into 6 pigeonholes, each representing 15 blocks. Each carrier would then receive the mail for his particular route. However, if one carrier covered the entire 89 blocks, as many as 9 divisions might be made in the re-sorting. Each would represent groups for roughly 10 blocks each, namely, 100-1000 block, 1100-2000 block, 2100-3000 block, and so on. When the mail sorter consolidated the 9 stacks, he'd have to be careful that the 8900-block mail was on the bottom of the pile, and that the 100 block was on the top. Moreover, the successive order of all mail in between would have to be correct. As the carrier walked along his route, the mail would come off the top of the pile and match the house numbers of the area.

This system is almost identical to that used in switching and delivering local freight. The cars must likewise be in successive order when the train arrives at each station. It would be just as impractical for a conductor to switch his train at each new station as it would for a postman to reshuffle his stack of mail every time he entered a new block.

a. Description of a local train. Most rail yards make up one or more daily local trains. These trains, generally called for the same time each day--and frequently occupying a place in the timetable--handle carload freight for the smaller stations along the line, which are generally not served by the through trains. The crews on these locals do switching work at each station, and sometimes they switch freight-house tracks and public and private team tracks and sidings en route. Frequently, the locals carry a way car--also called a peddler or a pool car--which is one containing individual less-carload shipments for consignees at the various stations along the way. The names for this car derive from the fact that it is unloaded along the way, and that the crew, in unloading the individual shipments, is reminiscent of a peddler unloading and delivering his wares. The following subparagraph presents

an example of the incorrect and the correct way of building up a local freight train.

b. Typical local. Switching and building up a local in proper station order can be rather complicated if a large number of cars of numerous groupings is involved. Figure 2.6 represents an 0500-hour track check of track 14 in Conroy yard. Cars have been switched in on this track for the previous 22 hours without regard to grouping or partial grouping. The yardmaster has marked the check for switching; note that the check reveals cars for every station except one between Conroy and AY yard. Cars for AY yard are also included and will move on the local next to the caboose.

(1) An examination of figure 2.6 shows that there would be 13 cuts of 8 groupings if the track were switched according to the track numbers in column I. Moreover, eight tracks would be required. The track would be switched in two cuts, the first consisting of the 9 AY cars and the second of the remaining 35 cars. To switch the entire track in one cut would be a waste of power because of the innumerable back and forth movements of these 9 cars which could be disposed of initially in one move. Another disadvantage of switching the track in one cut would be that, after the entire track was switched, the crew would have the 9 AY cars at the head end of all other groups. To get them in their proper place--the rear end of the train--the crew would have to reverse them with the LY group or use an extra track to dispose of them. Using a separate track would make an extra double when the train was doubled together. A switching list, showing the slow and incorrect method, as given in column I, is shown next.

First cut
east end No. 14

43199
cars track
9 to 8 (shove down to hold 40 cars)

116640
Engine

Doubles

cars	track	track
2 off	1	to 2
4 off	2	to 3
7 off	3	to 4
11 off	4	to 5
20 off	5	to 6
25 off	6	to 7
32 off	7	to 8

(12 cars on 8)

total
44 cars
caboose

Second cut
east end No. 14

41892
cars track
4 to 4
4 to 5
3 to 8
3 to 7
3 to 3
2 to 2
2 to 1
3 to 7
5 to 5
4 to 6
1 to 7
1 to 6

14672
Engine

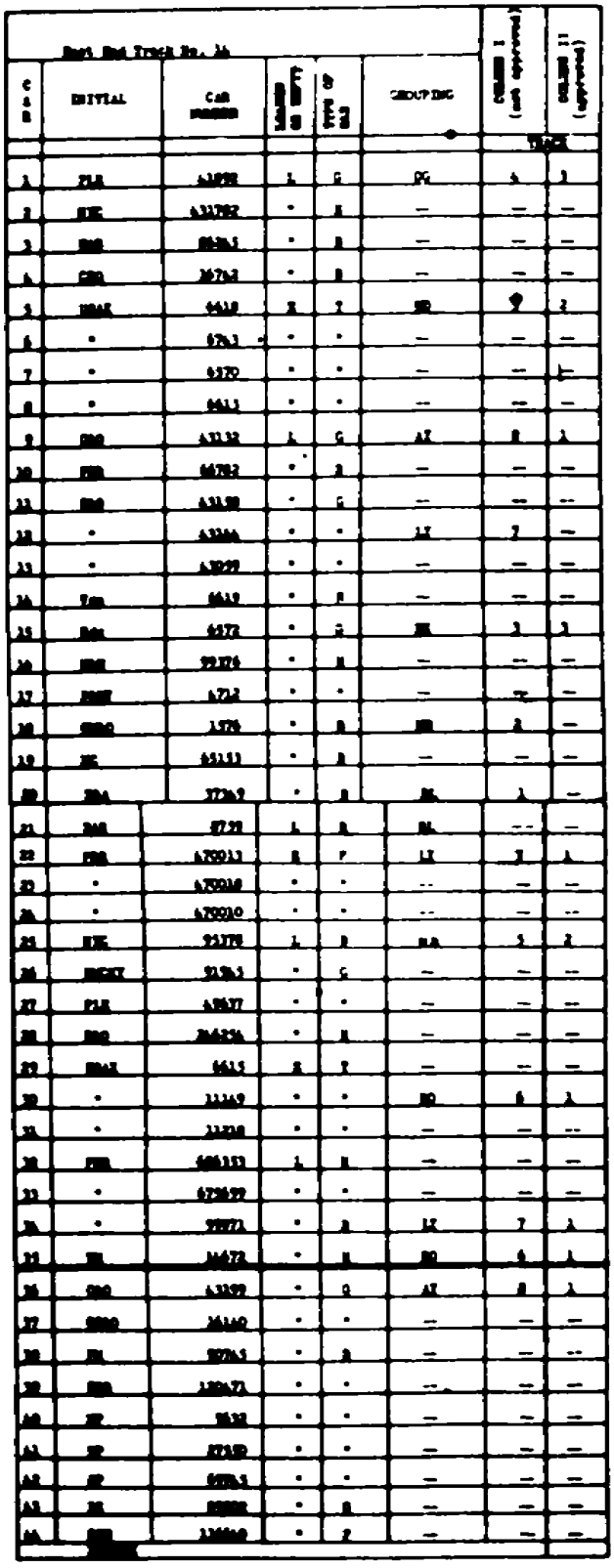


Figure 2.6. Track Check of Track 14 at 0500 Hours.

(2) Column II of figure 2.6 shows a slightly different method of switching the track. While the switching operation is reduced by only three cuts, the important saving of time is accomplished in doubling the train together after switching. A switching list of the method in column II of figure 2.6, showing full instructions to the conductor, follows.

First cut
east end No. 14

43199
cars track
9 to 1 (shove down to hold 40 cars)

116640
Engine

Doubles:
Cars track track
11 off 3 to 2
20 off 2 to 1
(24 cars on 1)
total
44 cars
caboose

Second cut
east end No. 14

41892
cars track
4 to 3
4 to 2
6 to 1
7 to 3
3 to 1
5 to 2
4 to 1
1 to 1 (switch to No. 1 before the cut of 4 to 1)
1 to 1
14672
Engine

(3) A comparison of columns I and II of the check of track 14 back in figure 2.6 reveals that the yardmaster has saved cuts and doubles principally by his marking of the cars 9 through 21, and by the handling of the 35th car. With the saving of three cuts and five doubles, an estimated 30 to 40 minutes have been saved. The saving in time might even be greater if other crews were using the same switching lead. Moreover, while making the doubles, the crew might possibly delay other yard crews wanting to use the switching lead. Since yard operations can cost a third of all rail transportation expenses, the importance of eliminating delays is apparent.

2.15. SUMMARY

Receiving inbound trains, classifying cars according to destination or commodity, and making up outbound trains are the main jobs to be done in a railway yard. When a train is received into the yard, inspectors go to work inspecting the cars for defects, making a record of any cars needing repairs. A yard clerk makes a track check showing the standing of cars in the train, from which a switch list is made that shows the order in which the train is to be cut or broken up and switched.

The cars are classified and grouped or blocked according to their destination or content. Outbound trains are made up from the cuts of cars by switching them to designated tracks in the departure yard. Crews must keep in mind the grouping principle that cars for the first setoff point should be placed directly behind the locomotive, cars for the next setoff behind those, and so on.

The next chapter discusses yard personnel and their work.

Chapter 3

YARD PERSONNEL AND THEIR DUTIES

3.1. GENERAL

The operation of a yard at a rail terminal requires a large number of workers assigned to a variety of duties. Large staffs exist for inspecting, maintaining, and repairing motive power and rolling stock. This chapter deals with those whose duties directly relate to yard switching work. Supporting personnel who make extensive repairs to cars and locomotives and to the track layout are covered in other texts. This chapter also discusses some of the documents and reports used in yard work, procedures involved in switching cars, and yard delays.

3.2. YARDMASTER

The yardmaster is in charge of all the workers in the yard. He is responsible for directly supervising all operating employees, and he indirectly supervises employees of the car repair platoon of the railway equipment maintenance company assigned as inspectors. In addition to those duties of the yardmaster that have already been covered, the first of the two subparagraphs that follow gives some of his other duties and responsibilities; the second explains the planning necessary for efficient yard operation.

a. Duties and responsibilities of a yardmaster that relate to switching include: admitting all trains and yard drafts of cars into the yard without delay; switching all inbound arrivals in a way that takes the least time; and making up outbound trains and arranging for crews to move them out of the yard. He does as much of the switching and train buildup on his shift as he can, trying to leave the yard in the best shape possible when the shift ends. The yardmaster's administrative duties include close supervision of all clerical personnel charged with keeping records and compiling information on forms that make a permanent record of all cars passing through the yard; maintaining a yardmaster's journal showing a complete and permanent record of yard movements,

which can be readily understood by a relieving yardmaster; furnishing superior officers with reports of accidents, personal injuries, and delays to trains and making appropriate recommendations. He also has duties relating to safety. He enforces a safety program designed to reduce or eliminate personal injury and property damage.

b. Planning is an important part of the yardmaster's work. He must think ahead at all times. What happens on the next shift is just as much his concern as what happens on his own. For instance, shop tracks in most yards are separate from main classification yards. When shop cars, or others, cannot be switched at once to their proper tracks, it is the policy of many yardmasters to switch them to the hold track. Other cars, such as locals, empties, and nonrevenue freight, are likewise switched to this track. Nonrevenue freight is any cargo a railroad hauls for itself. Before a shift changes, the yardmaster should make every effort to switch this track and put back only such cars as actually belong on it. Frequently, a yardmaster can have a crew space cars on shop tracks more conveniently than his relief can. Because extra yard crews may require an advance notice of 2 to 3 hours, a yardmaster must estimate the workload of the next shift so that he can order enough crews to be all ready when the new shift starts. Moreover, he must study the inbound lineup and compare it with cars already switched to be in a position to advise the dispatcher what extra freights may be ordered on the next shift.

3.3. YARD CLERK

The number of yard clerks required depends on the type, the degree of automation, and the volume of work to be done. If automation is not used, up to three clerks may be required on each shift. One clerk handles the inbound clerical work, one does all outbound clerical tasks, and the third is assigned to the outside work of checking cars. When there is a large number of tracks, two or more clerks may be required for the outside work. Clerical duties may vary considerably among railroads in different localities. Chapter 2, paragraph 2.7b, explains the main duties of the outside yard clerk. The following subparagraphs discuss inbound and outbound clerical work.

a. Inbound clerical work. An important part of inbound clerical work is entering on a form the initials and numbers of all cars arriving in the yard. Some railroads use a car record book, the pages of which are numbered 00 to 99. Car numbers, usually taken from the waybills, are entered on pages corresponding to the last two digits of the car number. For example AT&SF 35709 would be entered on the 09 page as AT&SF 357.

Another form often used is a 10-column sheet with the columns headed 0 to 9, and cars are entered according to their last digit. If automated systems are used, this information is entered into the system for access by railroad employees to check the progress of freight cars in which their railroads are interested. The inbound clerk checks the waybills against the completed track check to make certain that the numbers on the check agree with those on the waybills and that there is a car for every bill and a bill for every car. The check is then marked up according to the groupings as shown in the typical grouping area back in figure 2.1. Train sheet information may also be entered into an automated system.

Numerous other reports are often necessary. These include arrival notices to local consignees, hold notices, reweigh reports (necessary when bulk-loaded cars have lost part of their lading), and seal reports. All yards stamp each waybill on the back with a junction stamp which shows the time and date of arrival and the name of the yard. This makes it possible to check the time interval in and between various yards. Such notations often start inquiries resulting in corrective action when cars are being subjected to unreasonable layovers at any point between origin and destination. Most yards maintain an inbound and outbound train sheet which shows the engine number, conductor's name, arrival or departure time, and the number of loads and empties in each train or drag. A drag is generally a long, slow freight train; also a draft of cars usually without a caboose handled by a yard engine on a main track. The train sheet is usually maintained from 0001 through 2359 hours.

b. Outbound clerical work. When an outbound train has been called, the clerk assigned the outbound duties computes the gross tonnage. Forms used for outbound train records may differ slightly among railroads. Generally, a consist form is prepared which shows the initials, number, contents, gross weight, point of origin, and destination of each car. Special handling instructions for hazardous materials will be listed. Some consists may show the consignor and the consignee. This information will be electronically transmitted to the next yard to enable the yardmaster to make plans for switching the train. The following subparagraphs discuss other reports, forms, and checks that may be used to insure prompt and efficient car delivery.

(1) The wheel report is the responsibility of the train conductor. It shows the car initials and number, type of car, station number from which the car is moved, and the date. It also has columns for the station number and the date to be filled in when the car is delivered to the yard at the end of the conductor's run.

(2) A train lineup form, showing information such as the number of cars of the various groupings and the order in which they stand, as discussed in chapter 2, paragraph 2.6, is telegraphed to the dispatcher. This form also includes the engine number, the name of conductor and engineer, their time of duty, and the tonnage of the train.

(3) A home route card is often prepared and attached inside the waybill when a car moves from one railroad to another. This movement is called interchange. The card is the authority for the unloading railroad to return the car empty to the railroad from which it was received under load.

(4) The track check of an outbound train, made by the outside clerk, is checked against the waybills by the outbound clerk to be sure that the train is in station order. From this track check, outbound car records, similar to those described for inbound trains, are completed.

3.4. BILL RACK

Although automated systems have greatly streamlined and simplified the paper work requirements, the bill rack remains an important piece of equipment in a yard office. It may range from a crudely made affair, with the waybill recesses marked in chalk, to an ornate plate-glass-front arrangement with neatly painted figures to represent each track number. An ideal bill rack, with storage space for office supplies underneath, is shown in figure 3.1. The bill rack tells an observer a complete story that is only briefly outlined in the yardmaster's journal. A routine entry on track 13 in the journal showing 12 AY cars may become more important when the waybills are taken out of the rack and examined. The bills might show a car of perishable freight, a car that had previously been delayed 48 hours undergoing repair, and three or four cars of ammunition for a port of embarkation. Such freight should move on the next train out of the yard. The following subparagraphs further discuss the bill rack.

a. The rack always contains a separate section for every track over which the yardmaster has jurisdiction. Bills are placed in them in the exact order that the cars stand on the racks. When a crew switches loaded cars in the yard, the yardmaster switches the waybills to the appropriate slots in the bill rack, and in the exact order that the cars enter the track. In a westbound yard, when cars are switched to the west end of a track, the bills are usually placed in front of those already in the particular track slot. When cars are switched to the east end, bills are placed behind those already

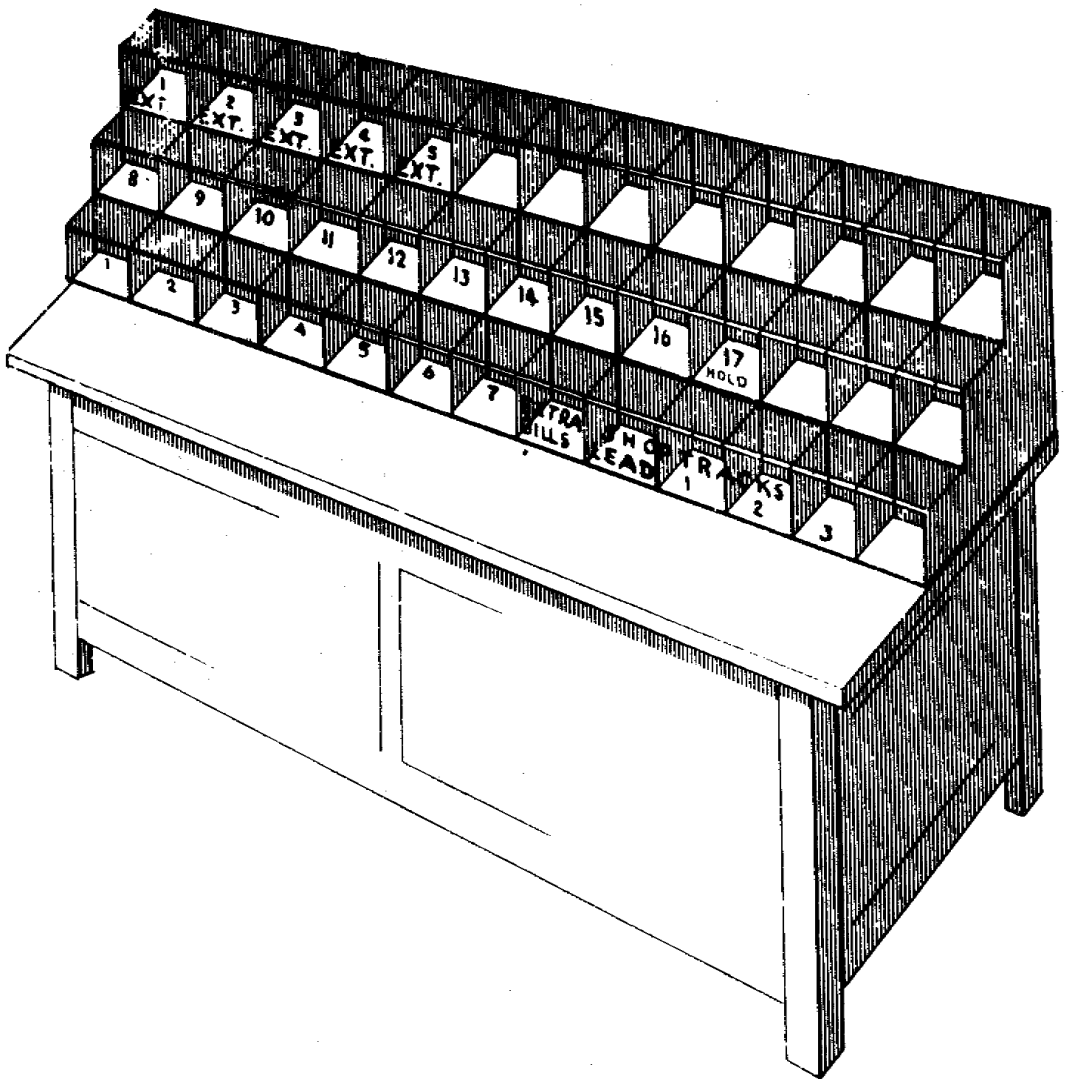


Figure 3.1. An Ideal Bill Rack.

in the rack. Careful switching of bills is just as important as switching of the cars. When bills are correctly switched, one may see the exact standing of a track merely by leafing through them. The separation of bills by tracks makes it a simple matter to estimate or compute the tonnage of any track when planning an outbound movement.

b. The standing of the waybills in a particular slot in the rack should agree exactly with the entry in the journal. However, it is extremely dangerous to look at track 9 slot, for example, and, because it contains no waybills, assume that the track is clear. The journal--never the bill rack--is the authority for determining the clear tracks on which trains may be ordered into the yard. A particular slot in the bill rack may be empty but a mistake may have been made in switching the bills, and cars may actually occupy the

track. Careful yardmasters never trust the bill rack implicitly-too many people use it. Instead, they rely on the journal in which only they are permitted to make entries.

3.5. YARD SWITCHING CREW AND ITS ACTIVITIES

A yard crew is generally composed of four members: the engineer, the conductor, and two brakemen. The brakemen may also be called switchmen; the one working farthest rearward from the engine is also known as the rear brakeman or fieldman, and the other the forward or head brakeman. If the workload requires it, additional brakemen may be assigned. Also, if steam motive power is used, a fireman is assigned. Where a long lead with a large number of switches exists, an extra brakeman or a switchtender may be assigned.

a. The yard conductor, sometimes called the switch foreman, is in complete charge of the crew and is responsible for carrying out the yardmaster's instructions in a safe and expeditious manner. Usually, the yardmaster delivers instructions in writing, and a conductor should insist on this if verbal instructions are complicated or apt to be confusing. Computer lists are often used if available. The conductor's duty is to inform his crew fully as to what is to be done and what method is to be followed.

b. The crew switches and makes up trains, places cars on side tracks and spurs for loading or unloading, and does all switching and moving of cars in the terminal or the yard to which it is assigned. Various methods of switching may be used, but in principle they are much the same. The first cut in the train at top left of the switch list back in figure 2.3 would be switched as follows: the conductor sends the rear brakeman (fieldman) down track 5 to make the cut. When the fieldman reaches the car numbered 19495, he uncouples at the far end of this car. He signals the engineer to back up, and the 28 cars are pulled out on the lead. The head brakeman boards the fourth car counting from number 19495. The fieldman lines the lead switch for track 16. The conductor then signals the engineer to kick, and when the draft, or cut of cars, has picked up enough speed, a stop signal is given. The head brakeman, who generally rides the draft, pulls the coupling lever between the third and fourth cars. The draft stops and the three cars upcouple and roll in on track 16 on their momentum. The fieldman opens the switch on track 6, and six cars are kicked to this track in the same manner.

The process is repeated as many times as there are cuts of cars to be placed on tracks. Both brakemen have copies of the

switch list so that they may proceed without verbal instructions from the conductor. With the use of lists of this type, cars must be counted in the original cut as well as the cars of each cut that go in on a particular track. If a crew completes a switching list and has a car left over, or the last entry on a switch list reads "3 to 4," and only two cars remain, every cut must be picked up off its track in the reverse order of the switch list until the mistake is discovered and corrected.

c. Good judgment must be exercised by the conductor in signaling the engineer. He must estimate the speed of the draft and regulate, by his signals, the speed at which the cars enter their respective tracks. A slight grade on the lead means that cars need not be kicked as hard as if the lead were level. About six kilometers per hour is the maximum safe speed for moving cars to couple on to stationary ones. If space on a track is limited, the conductor must see that cars enter at a slower speed than if the track had plenty of room or was clear. Conversely, if a switch list allots 15 or 20 cars to a clear track, the conductor should see that they are driven down the track as far as possible to leave room for additional entries. Fast-moving cars striking stationary ones can cause serious and costly damage, including: damage to couplers and draft gear; shifting of the load, requiring a car to go to the shop track for readjustment of the lading, damage to the contents of a closed car, resulting in freight claims; knocking an empty car offcenter, requiring labor to recenter it; breaking the door latches on a hopper or gondola car loaded with a bulk commodity and dropping the load to the ground.

d. Insufficient speed of cars is also a problem. Cars that are not kicked hard enough to clear the lead can cause lost time in switching operations if they must be pushed a second time into the clear under power instead of momentum. The only known rule and an exceedingly difficult one to follow is: "Kick cars hard enough but not too hard; or kick them easy but not too easy." When a stop signal to the engineer is being relayed through two or three brakemen, the signal should be given soon enough to allow for the delay in the engineer's seeing and executing it.

3.6. ANTICIPATING DELAYS

In addition to careful planning and prompt execution of duties by yard workers, successful yard operations also depend on a third and much less tangible factor: the skill and experience of yard workers in the prompt detection, correction, or elimination of delays. A minor incident may, if it escapes detection, lead to events that

defeat a planned operation. There is no simple, hard and fast rule for dealing with the countless occurrences that may hamper efficient yard operations. Their elimination depends primarily on the sense of team play and good judgment exercised by all yard employees. If a crew handling one job sees an opportunity to speed overall operations by either increasing their pace to clear the way for another crew or accepting a momentary delay of their work to permit another crew to complete a task of higher priority, such opportunities should be exploited fully. In brief, the complete operation is the concern of every man in the yard, and each must work with that idea in mind.

3.7. YARD DELAYS

Most railroaders know and fear the consequences of delays to main-line trains but are often less conscientious than they should be about delays occurring off the main track. Aside from the possibilities of accidents or rules violations, short delays to main-track trains on commercial railroads do not usually have serious consequences, if they are not too numerous. Unless a schedule is extremely rigid, most passenger trains and fast freights can make up a 10-minute delay, if they have 50-60 kilometers in which to do it. Delays to yard crews, however, are almost never made up. They may start a chain of events that increases the delay to three or four times the original time figure. How these delays pyramid and become serious, and what yard conductors can do to prevent them is outlined in detail in the following subparagraphs.

a. Typical yard delay. Assume that a yardmaster is building up a scheduled manifest train on track 5 in the combination yard illustrated in figure 1.2. A manifest train is a fast, through freight usually carrying priority cargo. Already somewhat short on time, he receives notice that four expedite cars for the head end of the train will be sealed and ready at 2130 at the siding of the manufacturing plant warehouses shown at the upper left of the illustration. Note that they are on the side of the main track opposite the yard.

(1) The yardmaster sends a crew in on track 5 with instructions to couple 45 care and pull them up and stop within 4 car lengths of the air plug. The 4 car lengths represent the space for the four expedite cars. On moving down track 5, however, a switchman discovers that only 40 cars are on the track and that the last car number does not agree with the one given him by the yardmaster. Accordingly, he checks with the crew switching at the east end and discovers that it is holding out five cars belonging on track 5. Unknown to the yardmaster, these five cars were held out for convenience in switching. Ten minutes are used waiting for them.

(2) When the crew pulls up to the west end, it is delayed 5 minutes more by another crew making a long double. Upon getting off track 5, the crew heads up to cross the main track to pick up the four cars for the head end of track 5. The yardmaster had planned on the crew's crossing at 2120, just ahead of first-class train No. 87. However, the conductor calls the dispatcher at 2130 and discovers that No. 87 is late. The dispatcher grants permission to cross only after No. 87 clears. When it clears, the engineer whistles out a flagman, the switches are opened, and the crew waits the 5 minutes prescribed by the rules for block signal territory. Upon crossing, the conductor again calls the dispatcher to inquire if it is permissible to leave the switches open because he will want to recross to the yard in about 5 minutes--just as soon as he can couple the four cars.

(3) The dispatcher refuses this request. He has a through tonnage train, waiting on a siding 3 kilometers east of the yard, that had previous permission to head out and proceed west just as soon as No. 87 passed. When the yard crew opened the main-track switch, a block signal close to the road train displayed a signal meaning: “Slow, proceed with caution.” If the switch were permitted to remain open, the road train would receive a red (stop) block after it had gone about 1 1/2 kilometers, and it would be forced to stop. In the light of this, the dispatcher orders the switches closed and instructs the yard conductor to wait until the road train clears.

(4) Meanwhile, the yardmaster sends his other west-end crew almost to the opposite end of the yard before discovering the predicament of the crew on the other side of the main. To start the air inspectors on track 5, he must now have them hook up a temporary airhose line over 100 feet long to reach from the air plug to the first car. When the crew arrives with the four cars, approximately 40 minutes have been lost, according to the yardmaster's original planning. Now a blue light, discussed in chapter 4, on track 5 prohibits entry and the four cars must be inspected and air tested before being ready for movement. All inspection personnel are working on track 5 and when they finish, 5 minutes more are lost inspecting and setting the four cars against the outbound train. Fortunately, the road engine has no trouble in making the road air test, and the train eventually departs 30 minutes late. This 30 minutes might easily develop into 60 minutes if, out on the road, the train were forced to take siding because of a first-class train behind it. A first-class train is a scheduled train so designated by timetable authority. Had the train departed on tine, it might have been able to go to a yard where it had a scheduled stop and where it would enter the yard to clear the train behind it.

(5) The yardmaster must write a letter to his superiors--and possibly telephone the trainmaster--explaining why he cannot do the comparatively simple job of getting a fast freight of only 50 cars out of the yard on time. Purely hypothetical? Don't believe it. Incidents like this happen frequently in a busy rail yard.

b. Prevention of delays. Yard conductors can often prevent delays by adhering to the following rules.

(1) Never hold out cars, or switch cars contrary to their listing, unless the yardmaster has granted permission. Keep in mind any cars so held out, and remind the yardmaster about them before the shift ends.

(2) Ask another yard conductor for priority of movement if it will result in less delay to the work.

(3) If a crew is blocked by another doing work of a lower priority, conductors should coordinate their movement so that the higher priority work is not delayed.

(4) If a crew is working some distance from the yard office, and developments occur that the yardmaster could not foresee when the work was assigned, the conductor should call the yardmaster and tell him of the changes.

(5) If a crew is unexpectedly and unavoidably delayed or prevented from doing assigned work, the conductor should call the yardmaster, tell him of the delay, and ask if there is other work he can do.

(6) When possible, the conductor should phone the yardmaster at intervals, keeping him informed of progress or the lack of it.

3.8. ENGINE CREW

The engine crew consists of an engineer, and a fireman if steam motive power is used, who work under the direction of the yard conductor. The engineer supervises the fireman and both are responsible for safe and efficient operation of the locomotive. In addition, the engine crew is responsible for certain specific duties in switching operations. These include: promptly executing signals given by the ground crew; correctly interpreting each hand signal and exercising the right to refuse a signal if it is not clearly understood; calling and repeating to each other hand signals, switch-light

colors, and signal-light aspects, to make certain that both read such signals similarly; answering the whistle signals of main-track trains with the appropriate whistle signals of the yard engine; complying with timetable instructions in crossing main tracks; questioning a signal when it is known to be, or reasonably believed to be, unsafe to obey it; and periodically inspecting and lubricating the running gear of the locomotive.

3.9. INSPECTORS

In military railroading, men of the car repair platoon of the railway equipment maintenance company are assigned to yards as inspectors. Car inspectors examine and make running repairs to cars entering a yard. Air inspectors test the airbrake equipment of trains after they are built up and before their departure from the yard. The following subparagraphs further discuss these men and their work.

a. Car inspectors. One of the most important jobs involved in the movement of trains is done by the car inspectors. If defects are not noticed and corrected, serious consequences may follow. If a defective car is dispatched in a train, it could cause a derailment or a lengthy delay in setting the car off en route. A typical method used by car inspectors to inspect long trains is outlined in chapter 2, paragraph 2.7a.

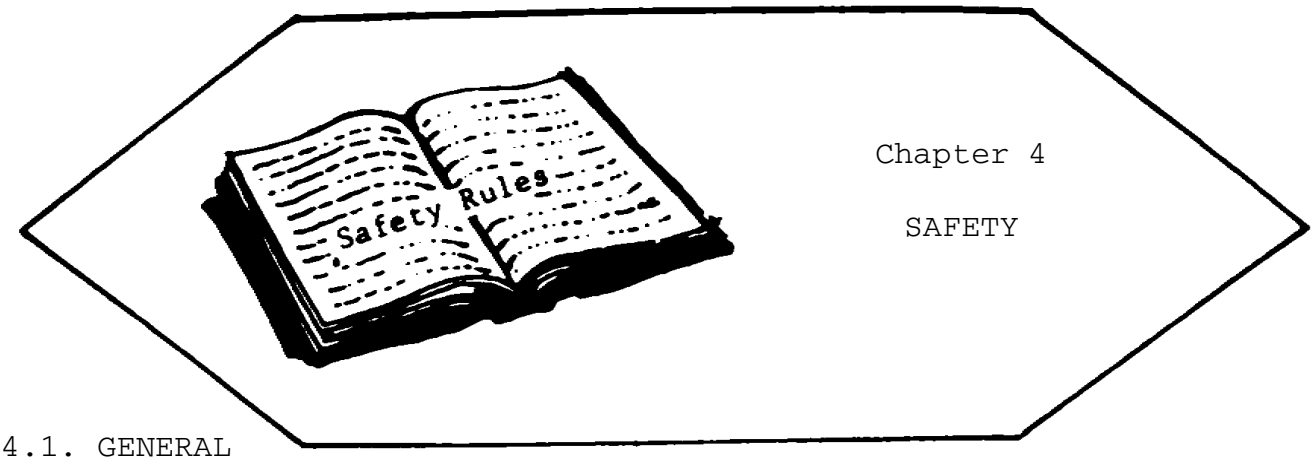
b. Defects. Each car must be checked for over 200 possible defects. Inspectors are required to make close inspection of wheels and flanges, journals and bearings, underframes, brake rigging, handbrakes, airbrake equipment, grab irons, sill steps, draft gear, and many other parts. Roof sheets, ladders, and running boards on closed-top cars must be inspected. Experienced men can usually inspect a car in less time than it takes to recount all the possible defects for which it must be inspected.

c. Air inspectors. Inspectors, often qualified in all phases of inspection, are sometimes detailed to air inspecting and testing only. When a train is coupled, it is moved to a point where the airhose on the first car is over the hose connected to the ground air line. The inspectors couple air gages between these hoses and start over the train, coupling the hoses between cars as they progress. When all hoses are coupled and sufficient pressure is attained in the trainline and reservoirs, a brake application is made on the train. The inspectors examine the piston travel to determine if enough braking force is being exerted on the wheels of each car. An adjustment to the linkage may be needed to cause

brakeshoes to exert greater force. Every car is inspected for excessive air leakage, and the gages are checked to determine the entire trainline leakage. If leakage is within permissible limits, usually 5 pounds per minute, the train is reported to the yardmaster as ready for movement. Should defective (bad-order) cars be found that cannot be repaired immediately, the car inspectors write up a "shop" or bad-order tag, and then the yardmaster has such cars cut out of the train.

3.10. SUMMARY

The efforts of the various crews, whose duties are outlined in this chapter, must be coordinated to the extent that the work of readying trains for movement proceeds smoothly and quickly. When a train is received into a yard, numerous workers go into action. They perform inside and outside clerical work, inspect for defects, switch according to classification or grouping, double-up according to the destination set-off order, and test train airbrake systems. Engine crews, yard crews, inbound and outbound yard clerks, car inspectors, air inspectors, and others, all do essential and special jobs. The yardmaster supervises the entire operation, with but one objective--keeping trains coming into one end of the yard and rolling out of the other.



Chapter 4

SAFETY

4.1. GENERAL

Writers on railroad subjects have jokingly asserted that it is possible to identify a railroad man by his large watch chain. This was not always so. Before the advent of the costly standard railroad watch and the somewhat cumbersome chain to hold it safely, a more gruesome means of identification existed: observation for the absence of fingers from either or both hands. Years ago, this was so common among railroaders in train service that hiring officials frequently looked at applicants' hands for mute verification of the experience claimed in the application form. The crude link-and-pin coupler was the chief culprit, and its eventual replacement by the automatic car coupler contributed more than anything else to a virtual elimination of hand injuries. Throughout the years, sill steps, grab irons, ladders, and running boards have been added or improved, with the resulting elimination of many other hazards that caused injuries and death.

A rail yard, however, is still a place of potential personal injury and property damage. Like the automobile and modern roads, rolling stock and rail yards have reached a high degree of mechanical safety, but the remaining contribution must come from the users. Volumes of safety rules have been written, extensive safety campaigns have been waged, and discipline has been enforced for rule infractions. Still, some injuries and deaths occur. The crisp certainty of the language of railroad rules lapses at one point into: "In case of doubt or uncertainty, personnel will take the safe course" --rule 108, TM 55-200. This rule, more than any other, places the final responsibility for safety directly on the individual. Railroad workers must think constantly of safety, and men working in, on, and around moving engines and cars must concentrate on what they are doing. Although railroads provide safe working equipment and comprehensive safety rules, workmen are responsible for their own safety and must not depend upon others to apply the rules for them. However, all workers should be properly instructed in safe

methods of doing their jobs. Workmen should familiarize themselves with appliances and pieces of equipment before using them, and make certain they are in good shape.

4.2. YARDS

Insuring safety in a busy rail yard where so many activities are taking place poses many problems. Some of these are discussed in the following subparagraphs, and several methods used to reduce the magnitude of the problems are explained.

a. Lighting. Railroads have contributed materially to accident reduction by lighting classification yards with numerous floodlights, such as those shown in figure 4.1. With such lighting

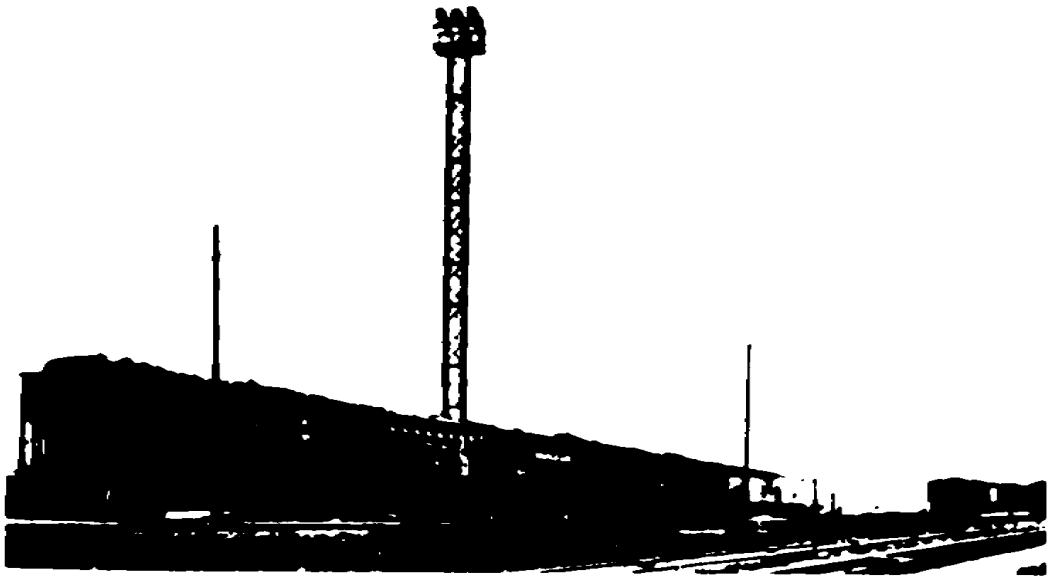


Figure 4.1. Floodlight Tower in a Classification Yard.

systems, it is possible to see clearly at night for 20 or 30 car lengths. Nevertheless, it is vitally necessary for yard workers to look both ways before stepping across a track. A slowly moving car--particularly a new, empty one--makes little noise, and yard workers must not depend on their sense of hearing to detect approaching cars because of the mechanical noises of locomotives.

b. Clean pathways. The space between tracks, often called the six foot, must be kept clear of coal, scrap, and other debris. Brakemen alighting from moving cars must pick a clean, level spot to land on. Even a small piece of gravel can turn a man's ankle and possibly cause him to fall. In darkness, if any doubt exists

about the condition of the ground, the brakeman should hold his lantern down and look at the ground before alighting.

c. Obstructions. Switch stands are natural obstructions on every switching lead. Sufficient clearance exists for a man standing on the bottom step of a moving car, provided he stands erect. He should never lean backward when passing a switch light. This applies more to older yards than to those designed and built in the last two decades or so. When a brakeman wants to get off a moving car, he should do so immediately after passing a switch. He will then have approximately 50 feet of unobstructed ground on which to alight. In little-used portions of auxiliary yards, switch lights are often removed to avoid cleaning and servicing the lanterns. Night crews working around unlighted switches must exercise extreme caution and determine that each switch is correctly lined before passing it. Likewise, brakemen must be careful not to stumble and fall over switch stands. Other obstructions that constitute hazards to a man riding the side of a car include tunnel walls, bridge piers, and permanent structures built close to the track. These are generally marked with signs which read "Close Clearance" or "No Clearance" and are usually equipped with red lights.

d. Clear tracks and telltales. Cars must be shoved far enough into the clear on each track to prevent limiting (fouling) the lead clearance. When an engine is shoving a cut of cars down a lead, the brakeman riding the first car of the cut must observe the clearance of each track before passing it. He must also be on constant lookout for cars being shoved toward him. A crew at the opposite end of the yard may be coupling a track and accidentally shove cars out on the lead. The brakeman riding a cut of cars should be prepared to signal the engineer to stop, and should attempt to line the switch correctly before the cars run through it and damage it. Overhead obstructions consist of bridges and trestles whose clearance is insufficient for a man on top of a car. Such obstructions are generally protected by telltales--small ropes suspended vertically from a cable extended across the track. The bottom of a telltale is 12 1/2 inches below the obstruction so as to strike the upper body of a man riding on top of a boxcar. The hanging ropes striking a man riding the top of a car mean one thing--get down at once!

4.3. MOVING EQUIPMENT

Cars and locomotives that are moving logically present the two chief causes of accidents in rail yards. Many rules have been written to cover specific incidents which experience has proved to

be dangerous. Other incidents for which no specific rule is readily applicable are presumed to be covered by the broad scope of rule 108, quoted in paragraph 4.1. The following subparagraphs discuss some of the ways in which accidents and injuries can be avoided.

a. Precautions. Yard personnel can reduce the chances of personal injury to themselves and others in numerous ways. Some of the more important ones are as follows.

Never crawl under cars unless your duties require at, and then only when the track has blue-flag protection, as outlined in paragraph 4.4. Do not cross between moving or standing cars. Use the ladder whenever possible.

When necessary to board a moving draft of cars, board the forward end of a car. The forward end is the end in the direction the draft is moving. Never board a moving engine by stepping up on the front footboard from ahead. Catch the rear end as the engine passes. Do not stand on the front footboard of an engine traveling in a forward direction.

If you must ride a draft of cars for a considerable distance and have a choice of types, climb inside an empty gondola, or board a flatcar, or a tank car with a full-length running board. When necessary to ride the top of a car to signal the engineer, station yourself in the center of the car, never at the front or rear end. Be prepared for and brace yourself against sudden starts and stops. When riding the top of a car, never ride with your hands in your pockets--it is too easy to be thrown off balance. Do not sit on rough or splintery running boards. Do not ride between cars, particularly on an end sill of a car loaded with pipe, steel shafting, logs, or similar freight subject to shifting.

Maintain a constant lookout for open-top cars loaded high with coal, coke, slag, limestone, or other bulk commodities that may be dislodged and fall when the car is bumped. If you see anything that you think might lead to danger, stop the engineer first and investigate later. When signaling an engineer, make certain that no engine but your own can see the signal. Do not step on rails when crossing tracks and never walk along the top of a rail. Wet steel is slippery and dangerous.

Never forget, particularly after dark, in which direction your engine is facing. A signal to proceed or to back up has different meanings based on whether the engine is facing you or headed away from you. Some railroads--particularly in foreign

countries--use signals meaning "come towards me" or "go away from me." Where these signals are used it makes no difference which way the engine is headed.

b. Alighting. Knowing and practicing the correct method of getting off moving cars is vitally important. The danger in incorrect or haphazard alighting increases, of course, with the speed of the moving cars. The following method applies to all speeds: when standing on a sill step, often called a "stirrup," facing the car, if the car is moving to your right, the left foot should hit the ground first. If the car is moving to your left, the right foot should touch first. In short, the foot opposite to the direction of travel must be the one to touch ground first. This holds true, no matter which side of the train the rider is on. In addition, if the draft is traveling comparatively fast, a safer landing can be made by leaning in the direction opposite to the direction of movement. The best rule in this connection, however, is: don't attempt to get off until you know you can land safely.

4.4. BLUE SIGNAL

While a red light is a signal no railroader regards lightly, a blue one probably commands a shade more respect. It means that cars or engines so protected must not be coupled to or moved. In daylight, it is usually a square metal flag painted blue and mounted on a 5-foot metal rod stuck into the ground at each end of a track. At night, a blue lantern or light is attached to the flag. On a yard classification track, the blue signal means that car inspectors are working on, in, or under the cars on that track. Railroad crewmen respect the blue signal for what it is: a sign of imminent, potential danger. Only the workmen who display the blue signal are authorized to remove it. A type of blue signal on some railroads combines a derail device and a blue flag. It is clamped to the rail and locked with a padlock, and it derails a car switched in against it. Where this type is not used, some railroads require that a blue-flagged track have its switch lined with the lead and locked with a padlock. This prevents a switching crew from inadvertently switching a car to a track thus protected.

4.5. BLEEDING AIR

Another danger that all car inspectors must guard against--a danger about which rules are strict and specific--deals with repairs to airbrake systems. Before attempting repairs to the airbrake system on a car in a train containing air, the car must be cut out from the remainder of the train and bled free of air. This is done by closing the angle cocks on each end of the car and bleeding the

air--releasing the valve on the reservoir from the particular car. Angle cocks are cutoff valves on the car air line. If this is not done, inspectors changing brakeshoes or adjusting brake linkage would more than likely be injured. If another inspector had reason to open the angle cock on either end of the train, or if an airhose burst anywhere in the train, it would result in an emergency application of brakes that could cause serious hand injuries.

4.6. SAFETY RULES

The following safety rules, quoted from DA Pamphlet 55-1, are applicable to all transportation railway service personnel. The rules are designed to protect workers and safeguard Government equipment.

a. Personnel must look in both directions when coming out of a building adjacent to tracks, or before crossing tracks. In walking parallel to tracks, they must stay as clear as duties permit and walk against the flow of traffic, keeping a lookout in both directions for approaching cars, trains, or locomotives.

b. Passing between locomotive and car, or between cars, for any purpose when either is moving and a coupling is about to be made, is prohibited. Before passing between standing locomotive or cars, personnel will give a hand or lamp stop signal, and wait for acknowledgment, unless the have a clear understanding with the engineer as protection against unexpected movement.

c. Personnel will not pass between or cross tracks adjacent to standing cars or locomotives without looking to see if it is safe. When locomotives, cars, or trains are passing, personnel must stand or pass at a sufficient distance to avoid injury from projections on the equipment, or falling objects.

d. Every precaution will be taken to prevent fires. Do not hold a match, lighted torch, open light, or heated object near a gas tank, reservoir, container, or storage battery.

e. Extreme caution must be exercised in the disposal of waste and other flammable material. Personnel engaged in such duties will keep properly covered so as to avoid burns.

f. Goggles of the appropriate kind will be worn when performing operations hazardous to the eyes. These include, but are not limited to such things as chipping, grinding, drilling, welding, cutting metal with shears or acetylene torches, riveting, handling

acids, and spray painting. Personnel watching or working near enough to such operations to be exposed to their hazards must also wear the prescribed goggles.

g. Scuffling, wrestling, or any kind of horseplay, while on duty is prohibited.

h. Ear coverings which interfere with hearing will not be worn while working on or about tracks.

i. Stepping in front of moving cars or locomotive to adjust drawbar, knuckle, or lock pin, or attempting to do so when engine or cars are about to come together, is prohibited.

j. When making a coupling, or uncoupling cars, yard or train service personnel will face the direction of movement, stand clear of track with feet well braced, one hand operating the lift lever, and the other hand on a lower grab iron as a brace, prepared to give proper signal when necessary.

k. When uncoupling airhose, both angle cocks must be closed. A live airhose can kick like a mule. Take a firm grip on the hose at coupling end and pull upward until air starts to escape. Hold in this position until most of the air in hose between the angle cocks has escaped to the atmosphere; then hose will part readily.

4.7. SAFETY DEPARTMENT

Virtually every major railroad today has a safety department, headed by a manager or superintendent. He is assisted by a number of agents who go over the railroad's divisions, following a set schedule, teaching the doctrine of safety. Safety agents travel from one point on a division to another, talking to shop crews, road gangs, and maintenance of way and maintenance of equipment groups, and closely observing the working habits of all the employees. Should these agents come across anyone using unsafe methods, they show the offender as diplomatically as possible the correct way to do the job and tell him why it should be done that way.

Whenever an accident occurs, a member of the safety department is sent to the scene. He interviews the principals involved and, with the appropriate supervisor, determines if there has been an infraction of rules. If the working practice is a common one, and no adequate safety rule exists, the superintendent of safety consults the proper authorities to formulate a rule.

The prime object of the safety department is to teach employees to think and act safely on the job as well as away from it. Safety rules are stressed, but only as a basis on which to urge the men to be alert to danger and to use their reasoning power to prevent accidents.

Safety among military personnel or local workers in a theater is, if possible, even more important than it is in the operation of commercial railroads. The prevention of accidents and the fostering of safe working methods help to assure the accomplishment of the mission with minimum loss of man-hours and greater economy of operations.

4.8. SUMMARY

Throughout the years, railway yards and equipment have been improved to reduce the hazards that cause damage, injury, and death. However, a rail yard is still a place of potential personal injury and property damage. Like modern automobiles and highways, railway yards and equipment have reached a high degree of mechanical safety, but the final responsibility for safety must be placed on the users.

Because of the complexity of activities taking place in a yard involving men and equipment, the safety rules outlined in TM 55-200 and DA Pam 55-1 must be strictly obeyed by transportation railway service personnel. The purpose of these rules is to insure safe and efficient work practices in military rail yard operations. To interpret and execute rules successfully one must understand the purpose and intent of the rules. Not only must one know the rules but also be able to apply the proper one in a given situation.

A railroader must be alert to danger and use his reasoning ability to prevent accidents. Volumes of rules may be written and extensive safety campaigns waged, but unless each individual assumes the responsibility for safety, injury and death will continue to occur. Each person must apply the safety rules for himself, rather than depend on others to apply them for him. The final responsibility for safety rests directly on the individual.

4.9. CONCLUSION

A railway yard receives, classifies, and assembles cars for departure. It may be a divided, a progressive, or a combination yard, but it always provides for these three functions. Additional facilities such as roundhouses, turntables, and repair tracks, and

certain yard tracks such as running tracks and necessary switching leads increase the efficiency of yard operations.

All activities in a yard are the responsibility of the yardmaster, and he supervises all of the personnel who work in it. He makes up switch lists from the yard clerk's track-check lists that instruct the switching crews how to process the cars through the yard. He also keeps a journal that presents at all times an accurate picture of the status of all work, cars, and tracks.

Car inspectors check each car on every train after it enters the yard and each car on every train before it departs. Whenever any defective car is found that cannot be repaired immediately, it is sent to the repair tracks.

Yard operation and supervision is a job that requires a lot of know-how and years of experience. From your study of this text, you should have gained an insight into the complexity of the task of maintaining a smooth and orderly progression of cars and freight through a railway yard.

In a military railway operation in a theater, a congested yard could cause a traffic jam that could result in logistical support failure. It is important, therefore, that transportation officers be familiar with yard operations and how they relate to the overall job of railroading.

CORRESPONDENCE COURSE OF THE
U.S. ARMY TRANSPORTATION SCHOOL
SOLUTIONS

TRANS SUBCOURSE 636.....Rail Operations, Yard.

(All references are to Reference Text 636.)

LESSON 1

Weight	Exercise	Weight	Exercise
2	1. B, false. (par. 1.7a)	2	16. B, false. (par. 1.6c)
2	2. A, true. (par. 1.5a)	2	17. A, true. (pars. 1.3b, 1.4)
2	3. B, false. (par. 1.5e)	2	18. A, true. (pars. 1.3, 1.4)
2	4. B, false. (par. 1.6b)		
3	5. A, true. (par. 1.5d)	2	19. B, false. (par. 1.3d)
3	6. A, true. (par. 1.5b)	3	20. A, true. (par. 1.7b)
3	7. B, false. (par. 1.5a)	3	21. A, true. (par. 1.7b)
3	8. B, false. (par. 1.5d)	3	22. B, false. (par. 1.7b)
3	9. B, false. (par. 1.5a)	3	23. A, true. (par. 1.7b)
3	10. A, true. (par. 1.6a)	3	24. A, true. (par. 1.7b)
3	11. B, false. (par. 1.6)	3	25. B, false. (par. 1.5e.)
3	12. A, true. (par. 1.6a)	3	26. A, true. (par. 1.5e)
3	13. A, true. (par. 1.6c)	3	27. A, true. (par. 1.5e.)
3	14. A, true. (par. 1.6b)	3	28. A, true. (par. 1.5e)
2	15. B, false. (par. 1.5c; fig. 1.2)	3	29. B, false. (par. 1.5e)

All concerned will be careful that neither this solution nor information concerning the same comes into the possession of students or prospective students who have not completed the work to which it pertains.

Supersedes Trans 636, Rail Operations, Yard, November 1970.

Weight	Exercise	Weight	Exercise
2	30. A, true. (par. 1.3b)	2	36. B. (par. 1.5b)
2	31. B, false. (par. 1.4)	2	37. D. (par. 1.6a)
2	32. A, true. (par. 1.3b)	2	38. A. (par. 1.3a)
2	33. A, true. (par. 1.3)	2	39. D. (par. 1.7c)
2	34. A, true. (par. 1.2)	2	40. C. (par. 1.2)
2	35. B. (par. 1.5a)		

LESSON 2

1	1. A, true. (par. 2.7)	2	13. A, true. (par. 2.8 fig. 2.3)
1	2. A, true. (par. 2.5)	2	14. B, false. (par. 2.8; fig. 2.3)
1	3. B, false. (par. 2.7b)	2	15. B, false. (par. 2.7b)
1	4. A, true. (par. 2.8a)	2	16. B, false. (par. 2.7b)
2	5. A, true. (par. 2.3)	2	17. A, true. (par. 2.7b)
2	6. A, true. (par. 2.3)	2	18. A, true. (par. 2.7b)
2	7. A, true. (pars. 2.6, 2.6b)	2	19. A, true. (par. 2.7b)
2	8. A, true. (pars. 2.2, 2.3)	2	20. A, true. (par. 2.9b (3))
2	9. B, false. (pars. 2.2, 2.3)	2	21. B, false. (par. 2.9b)
2	10. A, true. (par. 2.8; fig. 2.3)	2	22. B, false. (par. 2.9b)
2	11. B, false. (par. 2.8; fig. 2.3)	2	23. A, true. (par. 2.9b (1))
2	12. A, true. (par. 2.8; fig. 2.3)	2	24. A, true. (par. 2.9b (5))
		2	25. B, false. (par. 2.11a, b; fig. 2.3)
		2	26. A, true. (par. 2.13)

Weight	Exercise
2	27. B, false. (par. 2.13) Only four cuts were saved.
2	28. A, true. (par. 2.13; fig. 2.3)
2	29. A, true. (par. 2.13)
2	30. A, true. (par. 2.8b)
2	31. B, false. (par. 2.8b)
2	32. A, true. (par. 2.8b)
2	33. B, false. (par. 2.8b)
2	34. A, true. (par. 2.8b)
4	35. A. (par. 2.11a; fig. 2.3)
4	36. D. (pars. 2.2, 2.3; fig. 2.1)
4	37. C. (par. 2.14b(2); figs. 2.1, 2.6) The train is in proper grouping order with the first and each successive setoff placed so that it will be directly behind the engine. In choice A, the RK cars are not in proper order; in choice B, the OG cars; and in choice D, the MD cars.
4	38. A. (pars. 2.2, 2.3, 2.6; fig. 2.1) In choices B, C, and D, the FV, the WD, and the OG, respectively, are not in proper station order.
4	39. B. (pars. 2.2, 2.6; fig. 2.1) Choice A shows the reverse order of grouping; in choice C, the DW, SV, and ELT cars are not in proper order; and in choice D, the first four groupings are not in proper order.

Weight	Exercise
4	40. D. (par. 2.8a) Ordinarily a group of cars is not broken. This block ends with car 10030; therefore the cut is made between cars 10030 and 10035.
4	41. C. (par. 2.8a) There are only 8 different groups; therefore only 8 tracks are needed.
4	42. D. (figs. 2.1, 2.3) Because the 1 CP and 2 OW cars (Nos. 26, 27, and 28) are together and all go to the same track, only one cut is required here; therefore 25 cuts are necessary to switch the entire train.
4	43. C. (fig. 2.3) Since the BO, WD, and LY cars all go on one track, and all the OW and CP cars all go on another, only 9 different groupings remain. Therefore 11 tracks are required for the entire train.

LESSON 3

2	1. A, true. (par. 3.3b(3))
2	2. B, false. (par. 3.5)
2	3. A, true. (par. 3.7)
2	4. A, true. (par. 3.5c)
2	5. A, true. (par. 3.5c)
2	6. B, false. (par. 3.7a)
2	7. A, true. (par. 3.5c)
2	8. A, true. (par. 3.5d)
2	9. B, false. (par. 3.5b)

Weight	Exercise
2	10. A, true. (par. 3.4a)
2	11. B, false. (pars. 3.3b(1), 3.4)
2	12. A, true. (par. 3.4)
2	13. B, false. (par. 3.4b)
2	14. A, true. (par. 3.4a)
2	15. B, false. (par. 3.7a(1))
2	16. A, true. (par. 3.7b(4))
2	17. A, true. (par. 3.7b(2))
2	18. A, true. (par. 3.6)
2	19. A, true. (par. 3.7b(3))
3	20. C. (par. 3.5b)
3	21. E. (par. 3.3a)
3	22. A. (par. 3.8)
3	23. D. (par. 3.3b(4))
3	24. B. (par. 3.5b)
3	25. D. (par. 3.2a)
3	26. D. (par. 3.2b)
3	27. B. (par. 3.7a(2))
3	28. D. (par. 3.2a)
3	29. A. (par. 3.3b(1))
4	30. B. (par. 3.4)
4	31. A. (par. 3.3a)

Weight	Exercise	Weight	Exercise
4	32. C. (par. 3.3a)	4	35. A. (par. 3.9c)
4	33. A. (par. 3.5b)	4	36. D. (par. 3.5d)
4	34. B. (par. 3.7a(2))	4	37. C. (par. 3.3a)

LESSON 4

2	1. A, true. (par. 4.1	4	16. A, true. (par. 4.4)
2	2. A, true. (par. 4.7)	4	17. A, true. (par. 4.4)
2	3. A, true. (par. 4.3a)	4	18. A, true. (par. 4.5)
2	4. B. false. (par. 4.7)	4	19. A, true. (par. 4.5)
3	5. A. true. (par. 4.2c)	4	20. B, false. (par. 4.5)
3	6. B, false. (par. 4.6i)	4	21. A, true. (par. 4.5)
3	7. A, true. (par. 4.3a)	4	22. B. false. (par. 4.5)
3	8. B, false. (par. 4.3a)	3	23. B, false. (par. 4.2d)
3	9. A, true. (par. 4.3a)	3	24. B. false. (par. 4.2d)
3	10. B, false. (par. 4.2c)	3	25. A, true. (par. 4.2d)
3	11. B, false. (par. 4.3a)	3	26. B, false. (par. 4.2d)
4	12. A, true. (par. 4.4)	3	27. A, true. (par. 4.2d)
4	13. A, true. (par. 4.4)	4	28. A. (par. 4.1)
	14. B, false. (par. 4.4)	4	29. C. (par. 4.4)
4	15. B, false. (par. 4.4)	4	30. D. (par. 4.3b)

Appendix II

GLOSSARY

Although these terms are fairly common, personnel from one area of the country may not use them in the same manner as those from another. Care must be taken to insure that all personnel in a railway unit accept these terms, or misunderstandings and accidents may result.

Agent--railroad representative who solicits and/or receives and bills freight shipments; one who solicits or sells passenger service.

Air inspector--car inspector assigned to testing air on outbound trains.

Air plug--point on the underground air line, at which an airhose is attached to couple to the first car on a train.

Air tested--train or cars that have been tested and OK'd by air inspectors.

Angle cock--valve on each end of the air line on cars and locomotives.

Ash dock--pit between the tracks where ashes from steam locomotives are dumped; also called cinder pit.

Bad-order car--car having defects which must be repaired immediately, or after the car is unloaded. Also called shop car, shop, or cripple.

Bill--See Waybill.

Bleed rod--rod that releases the air in a car reservoir.

Brakeman--crew member in train service who works under the supervision of the conductor; in yards, he usually does switching work.

Caboose valve--valve on the caboose that may be opened to apply train brakes; sometimes equipped with a whistle to warn or attract attention.

Car classification--group designator assigned to a car of freight; also switching cars to tracks according to the classification.

Car inspector--one who inspects cars for mechanical defects; popularly known as a car-knocker.

Car retarder--mechanical device used in hump yards to reduce the speed of cars.

Centralized Traffic Control (CTC)--trade name coming into general usage for all electrical systems that permit an individual to flash lights and throw switches many kilometers away be remote control.

Check or checking a train--recording on a blank form the initials and numbers of each car in a train.

Classification grouping--same as car classification.

Combination yard--yard where tracks are used interchangeably for inbound and outbound trains, and for classifying cars.

Conductor--individual in complete charge of a crew and/or a train.

Consist--report showing initials, number, contents, point of origin, weight, and destination of each car in the order it stands in a train; also a report that shows only the destination of all cars.

Coupler; coupling--mechanical knuckle that couples cars: also couple, to "lock" cars together.

Current of traffic--specified direction of travel of trains on a track or line; usually specified by timetable.

Cut of cars--group of cars. Loosely applied to any large or small group of cars that are moved from one place to another in a yard or terminal.

Cut off--remove a car or cars from either end of a train; also cut-off, a bypass track.

Cut out--remove a car from a train. Or, render the brake inoperative on a particular car.

Derail--steel obstruction placed on top of a rail to cause the wheels to leave the rail. Also as a verb, to run off the track.

Dispatcher--individual who has complete charge of train movements over main tracks.

Divided leads--arrangement where yard tracks branch off two or more leads.

Double together--moving a train or group of cars from one or more tracks to another track.

Double-track main line--main line having two tracks, one for movement in one direction and the other in the opposing direction.

Doubling, "double them up"--moving cars off one track and coupling to cars on another; also a single engine negotiating a hill by taking the train over in two or more sections.

Drag--specifically, a draft of cars, usually without a caboose, being handled by a yard engine on a main track. Generally, any long, slow train.

Empty--car without lading, popularly abbreviated "mty."

Engineer or engineman--locomotive operator; commonly known as hogger, hoghead, and driver.

Expedite movement--train that must be given priority handling because of "rush" freight.

Feeder lines--usually small railroads that deliver their freight to a major railroad at one of the latter's terminals.

Fireman--assistant to the engineer who keeps up steam in locomotives and calls and repeats signals.

First-class train--scheduled train so designated by timetable authority; it has precedence over second-, third-, and fourth-class trains.

First out--car or engine on the extreme end of any track; also a crew next in order to be called for duty.

Flagman--usually the brakeman who flags and protects the rear end of a train; also any workman who may be stationed anywhere to stop or slow down traffic.

Flat yard--switching yard having no gravity hump.

Foreign road--railroad of different ownership than the one on which the term is used.

Fouling--locomotives or cars on a track blocking the movement or clearance on an adjacent track.

Fusee--red flare that will burn for 5 minutes. Also made in 10-minute size.

Gross trailing load--maximum weight or load in short tons that a locomotive can safely pull behind it under given conditions of curvature and grade, or on level track.

Ground air line--pipe carrying compressed air to a track for charging the air systems of cars or trains.

Head end--end of the train closest to the engine; end of the yard tracks from which locomotives depart.

Heavy repairs--repairs to equipment that require several days or weeks to make.

Hold out--place cars on any track temporarily and later place them on the track designated by the switch list.

Hold track--track on which cars awaiting proper disposition are placed.

Hostler--one who moves engines around the yards and roundhouse area.

Hotbox--hot axle journal, usually caused by insufficient oil, lack of waste, or foreign matter in waste; also caused by waste wedging between the journal and bearing (waste grab), mis-alined trucks, and rough journals.

Hump yard--yard having an incline or hump over which cars are pushed and continue to roll by gravity.

Inspection track--track where close inspection is made on equipment; frequently equipped with a pit so that inspectors can examine the undersides of cars or locomotives.

Interchange--act of one railroad delivering cars to another

Interlocking plant--arrangement of switches and signals so interconnected that their movement must succeed each other in proper secquence. It may be operated manually, electrically, or with compressed air.

In the clear--far enough in on any track to prevent blocking passage on tracks on either side.

Kick--push cars with an engine, uncouple them and allow them to roll on momentum to a desired location.

Kicking cars into the clear--see In the clear.

Lead--long straight track at each end of a yard from which numbered yard tracks diverge. Often any nonmain track that must be kept open for frequent movement. See Switching lead.

Light engine--engine without cars or caboose.

Local--passenger or freight train that stops at every station on the line.

Journal--book kept by yardmasters to reflect the conditions on every track under their jurisdiction; also called a turnover book because it is turned over to the relieving yardmaster.

Main reservoir--air storage tank on locomotives. On cars, it is defined as an auxiliary reservoir.

Meet or pass--meet occurs when two trains pass in opposite directions; a pass occurs only when one train passes another traveling in the same direction.

Message hoop or loop--bamboo rod bent to resemble the figure 9. A message is tied to the rod, and a man on a moving train catches it by hooking his arm through the loop. Or, a bamboo or other like material rod with a long handle that divides into a "Y" at the top, and on which a string with message attached is clipped.

Mixed train--train moving both freight and passengers; a freight train or group of cars that has not been built up in station order.

No bill--absence of a waybill for a car; or, car for which there is no waybill.

Nonrevenue freight--cars containing equipment and supplies for use by the railroad hauling them; also called company-use freight.

Off center--car body not resting squarely on its trucks.

Operator--telegrapher; also a workman who operates any electrically controlled switches, such as car retarders, track switches, and interlocking switches.

Pickup--one or more cars readied for a road train to pick up and move on the train.

Pilot--cow catcher on the front of a locomotive. Also, a second engineer that accompanies the regular engineer when the latter is not familiar with the physical characteristics of the area.

Pits--see Inspection track.

Pulled drawbar--broken coupler or draft gear, damaged to the extent that it is impossible to pull car or locomotive from the damaged end.

Pusher engine--engine used to assist a train out of a yard or over a grade by pushing from the rear end. If the extra engine is on the head end, it is called a "helper."

Put away--dispose of cars by switching them to the proper tracks.

Railway junction--point where two or more railroads meet and interchange cars; also a point where a branch line meets a main line.

Ready track--track in the vicinity of the roundhouse on which locomotives are placed when ready for service.

Road engine--large, powerful locomotive used primarily to pull trains over main-line tracks between division terminals.

Roundhouse--engine stalls placed in a circular position, usually forming 50 to 80 percent of a circle, in which steam engines are inspected, serviced, and repaired. Diesel-electric locomotives are more easily serviced in a straight-through building.

Running track--track, usually extending the length of a yard, on which traffic may move more quickly than over the yard classification tracks.

Sand house--building in which a fine grade of sand is thoroughly dried before being placed in locomotives. The sand is used to make starting easier and to prevent locomotive drivers from slipping. In jest, the place where all rail rumors and gossip originate.

Setoff--one or more cars of a train that are to be set off at the proper station or terminal.

Setoff order--order of the cars in a train in relation to the stations along the line.

Shop tracks--tracks on which light and heavy repairs are made to cars, or where cars are completely rebuilt and repainted and stenciled.

Single lining--act of running a train against the current of traffic to pass another train on double- or multiple-track lines.

Six foot--space between two tracks; for example, the space between the two tracks of a double-track line.

Spot--place a train so that the airhose of the first car is directly over the airhose of the ground air line; also to stop a car at a point where its side or bottom doors are directly opposite or over warehouse doors, coal chutes, conveyors, elevators, etc.

Spur--usually a short track having a dead end.

Standing--line-up of the consist of a train or track, usually starting from the head end and reading to the rear.

Switch--device that moves the rails (switch points) laterally to permit movement from one track to another. Also, as a verb, to switch a track.

Switch a track--switch the cars on a track.

Switching lead--track from which numerous numbered tracks branch.

Switching list--list showing track numbers on which cars being switched are to be placed; also called cutting list.

Switchman--same as a yard brakeman.

Switch yard or switching yard--any yard where switching is done.

Tangent--straight stretch of track.

Terminal air test--thorough test of airbrakes to determine if there are any defective brakes in a train, it is made before leaving a yard or terminal.

Through train--train whose consist includes only freight destined from one division terminal to the next one or beyond.

Track check--form filled out by a yard clerk which shows initials, numbers, contents, and seal numbers (on closed cars, if loaded) of all cars on that track.

Train consist--see Consist.

Train density--average number of trains per day over a specified section of railroad.

Train order--written order from a dispatcher to a train crew giving instructions and authority to proceed over specific sections of a railroad.

Waybill--authority for moving a car; in addition to the information in the consist, it shows the consignor, consignee, freight charges, and routing.

Wheel report--form showing car initials and number, whether loaded or empty, gross and net tonnage, date, and station number. It is compiled for every car moved in road service, and used in tracing car movements. In addition, it shows engine number, train number, names of crew members, and arrival and departure times at each stop. It is a complete history of the train's movement over the division.

Wye--section of track resembling the letter Y except that a connecting track joins the two projecting forks of the Y. This makes it possible to reverse the direction of a locomotive, equipment, or train.

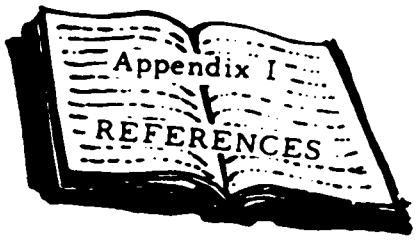
Yard clerk--clerical worker in a yard office or yard. See Track check.

Yard crew--crew employed in yard switching service.

Yard limits--slow-speed area on main tracks, often extending 8 to 16 kilometers from either end of a yard.

Yardmaster--individual in complete charge of all personnel and activities within a yard.

Yard power--crews and locomotives for yard switching work.



Army Regulations

AR 310-25	Dictionary of United States Army Terms
AR 310-50	Military Terms, Abbreviations, and Symbols, Authorized Abbreviations and Brevity Codes

Field Manuals

FM 55-20	Army Rail Transport Operations

Technical Manuals

TM 55-200	Railway Operating Rules
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